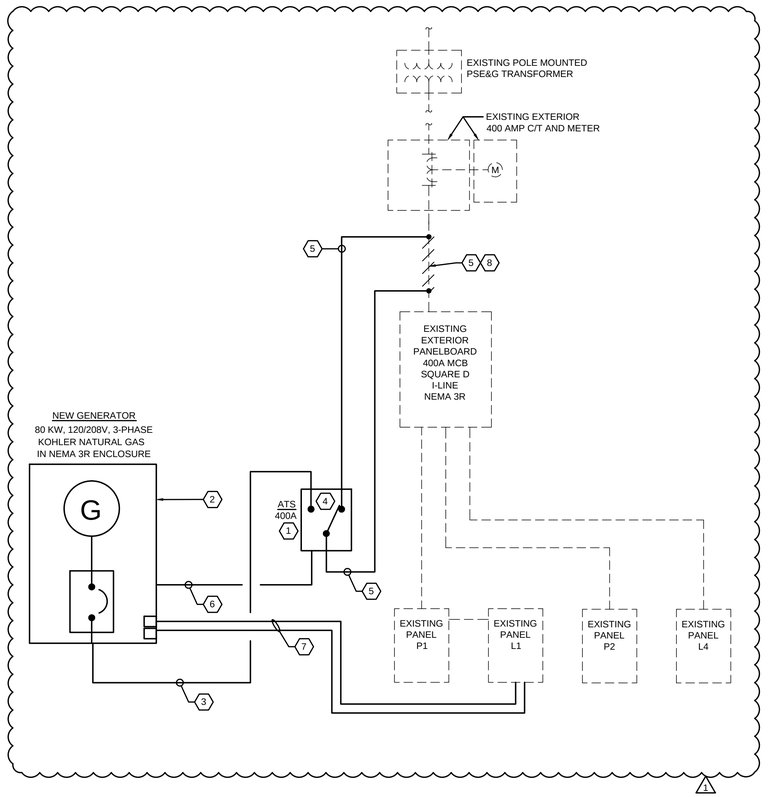
ELECTRICAL GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC AND DEFINE THE INTENT OF THE WORK. LOCATIONS OF EQUIPMENT, FIXTURES, DEVICES, PANELBOARDS, DUCTS, PIPING, DIFFUSERS, PARTITIONS, OPENINGS, ETC. ARE APPROXIMATE AND ARE SUBJECT TO MODIFICATIONS CAUSED BY STRUCTURAL CONDITIONS AND EQUIPMENT PROVIDED BY OTHER CONTRACTORS, SUBCONTRACTORS OR THE OWNER. COORDINATE ALL WORK WITH THE WORK OF OTHER TRADES. DETERMINE ROUGHING LOCATIONS FROM APPROVED SHOP DRAWINGS. MINOR MODIFICATIONS OF LOCATIONS REQUIRED TO EFFECT SUCH COORDINATION SHALL BE MADE AT NO COST TO THE OWNER.
2. SPECIFICATIONS MAY REQUIRE WORK, EQUIPMENT, SYSTEMS, METHODS, ETC. THAT IS NOT INDICATED ON THE DRAWINGS.
3. DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE COMPLEMENTARY TO EACH OTHER. WHERE DISCREPANCIES OR CONFLICTS OCCUR, THE CONTRACTOR SHALL INCLUDE THE MORE COSTLY METHOD IN HIS PROPOSAL UNLESS CLARIFIED BY BULLETIN OR ADDENDUM ACKNOWLEDGED PRIOR TO RECEIPT OF BIDS.
4. DRAWINGS SHALL NOT BE SCALED. DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND REQUIREMENTS OF THE WORK. ALTHOUGH SIZE AND LOCATION OF EQUIPMENT IS DRAWN TO SCALE WHEREVER POSSIBLE, CONTRACTOR SHALL MAKE USE OF ALL DATA IN ALL OF THE CONTRACT DOCUMENTS AND VERIFY INFORMATION AT THE PROJECT SITE.
5. THE OWNER WILL OCCUPY THE SITE AND EXISTING BUILDING DURING THE ENTIRE CONSTRUCTION PERIOD. COOPERATE WITH THE OWNER DURING CONSTRUCTION OPERATIONS TO AVOID ANY CONFLICTS. PERFORM THE WORK SO AS NOT TO INTERFERE WITH THE OWNER'S OPERATIONS. SCHEDULE ALL POWER OUTAGES FOR OVERTIME ON SUNDAYS AND HOLIDAYS AT NO ADDITIONAL COST TO THE OWNER.
6. EXISTING PROJECT CONDITIONS INDICATED ARE BASED ON FIELD OBSERVATION AND ARE INTENDED TO INDICATE THE SCOPE OF THE WORK AFFECTED BY THIS PROJECT.
7. THE TERM "OTHERS" SHALL BE UNDERSTOOD TO MEAN CONTRACTORS, SUBCONTRACTORS OR TRADESMEN ON THE PROJECT PERFORMING WORK ON THIS PROJECT UNDER SECTIONS OR DIVISIONS OTHER THAN DIVISION 16 - ELECTRICAL WORK.
8. VERIFY THAT FIELD MEASUREMENTS ARE AS INDICATED.
9. PRIOR TO BIDDING, VISIT THE PROJECT SITE TO DETERMINE THE CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. SCHEDULE SITE VISIT WITH OWNER.
10. PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT REQUIRED FOR THE INSTALLATION, RELOCATION AND CONNECTION OF THE ELECTRICAL WORK.
11. ALL MATERIAL SHALL BE UNDERWRITERS' LABORATORIES LISTED FOR ITS APPLICATION WHERE SUCH LISTING IS APPLICABLE.
12. ALL EQUIPMENT SHALL BE AS INDICATED OR AS APPROVED BY THE ENGINEER.
13. SUBMIT SHOP DRAWINGS, PRODUCT DATA SHEETS AND WIRING DIAGRAMS FOR ALL ELECTRICAL CONSTRUCTION MATERIALS, DEVICES, EQUIPMENT, APPLIANCES AND SYSTEMS.
14. SUBMIT IN QUANTITY TO ALLOW DISTRIBUTION TO OWNER (2), ENGINEER (2), PRIME CONTRACTORS (1 EACH), AND CONTRACTOR'S OWN USE AS REQUIRED.
15. UNLESS SPECIFICALLY INDICATED OR REQUESTED OTHERWISE, BIND ALL PRODUCT DATA TOGETHER PROPERLY INDEXED AND IDENTIFIED AND WITH ALL PERTINENT CATALOG NUMBERS, OPTIONS, ETC. HIGHLIGHTED OR TARGETED. LOOSE SHEETS OR BINDING SYSTEMS RELYING ON PAPER CLIPS OR SLIP ON SPLINES WILL BE DISCARDED AND THE TRANSMITTAL RETURNED TO THE CONTRACTOR.
16. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CURRENT EDITION IN EFFECT OF THE NATIONAL ELECTRICAL CODE (NEC), NATIONAL ELECTRICAL SAFETY CODE (NESC), AMERICAN ELECTRICIANS' HANDBOOK, NEW JERSEY UNIFORM FIRE CODE (NJUFC), NEW JERSEY UNIFORM CONSTRUCTION CODE (NJUCC), INTERNATIONAL BUILDING CODE (IBC), ACCESSIBLE & USABLE BUILDINGS & FACILITIES (ICC/ANSI A117.1) AND NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA) STANDARD OF INSTALLATION.
17. OBTAIN ALL PERMITS REQUIRED, HAVE THE WORK INSPECTED FOR CODE COMPLIANCE AND PAY ALL FEES FOR INSPECTION AND CERTIFICATION.
18. MAINTAIN CONTINUITY OF EXISTING CIRCUITS AFFECTED BY THIS WORK WHICH MUST REMAIN IN SERVICE.
19. WHERE ELECTRICAL EQUIPMENT (I.E. PANELBOARDS, DISCONNECTS, ETC.) IS INDICATED TO BE MODIFIED TO ACCEPT NEW WORK SAID MODIFICATIONS SHALL BE PERFORMED BY ELECTRICAL EQUIPMENT FABRICATORS OR MANUFACTURER'S REPRESENTATIVES WHO CAN AFFECT SUCH MODIFICATIONS WITHOUT VOIDING THE UL LABEL OR MANUFACTURER'S WARRANTIES.
20. WHERE EXISTING EQUIPMENT IS INDICATED TO BE "CONNECTED" OR "RECONNECTED" TO NEW WIRING, CONDUIT, ETC, THE CONTRACTOR SHALL FABRICATE AND INSTALL THE NEW SYSTEM CONNECTIONS TO MATCH THE CONNECTION POINTS AND OTHER REQUIREMENTS OF THE EXISTING EQUIPMENT. WHERE THE EXISTING EQUIPMENT MUST BE REMOVED AND REINSTALLED TO FACILITATE THE REMOVAL OF THE OLD CONNECTIONS AND/ OR THE CONNECTION OF THE NEW MATERIAL, THAT WORK SHALL BE A PART OF THIS CONTRACT.
21. GROUNDING AND BONDING SHALL MEET NEC AND EQUIPMENT / SYSTEM MANUFACTURER'S REQUIREMENTS.
22. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF DEBRIS GENERATED BY HIS WORK AND WORKERS AT THE END OF EACH WORKING DAY AND FOR GENERAL GOOD HOUSEKEEPING BY HIS WORKERS. CONTRACTOR SHALL PROVIDE REQUIRED REFUSE CONTAINERS.
23. DISCONNECT AND REMOVE FROM THE PREMISES, OR STORE ON THE PREMISES IF REQUESTED BY THE OWNER, ALL DEVICES, RACEWAY, WIRING, CABLE, SUPPORTING DEVICES, ETC. REMOVED OR ABANDONED AS A RESULT OF THIS WORK. MAKE SAFE ALL WIRING AND CABLE WHICH MUST REMAIN IN SERVICE.
24. REMOVE AND RELOCATE EXISTING EQUIPMENT, FIXTURES, DEVICES, ETC. AS INDICATED AND AS REQUIRED TO CLEAR NEW WORK. EXTEND AND CONNECT NEW WIRING TO EXISTING.
25. REMOVE AND REINSTALL CEILING SYSTEM AS REQUIRED FOR THE INSTALLATION OF ELECTRICAL WORK AND REPLACE IN KIND ANY COMPONENTS DAMAGED BY PERSONNEL OR EQUIPMENT DURING PERFORMANCE OF THE WORK. COORDINATE WITH ARCHITECT.
26. PERFORM ALL CUTTING AND PATCHING REQUIRED FOR THE INSTALLATION OF THE WORK. CUT NO STRUCTURAL MEMBER WITHOUT WRITTEN PERMISSION FROM THE ENGINEER. FINISH AND PAINT ALL PATCHED SURFACES WITH TWO COATS OF PAINT TO MATCH EXISTING SURFACES AS CLOSELY AS POSSIBLE. SEAL OPENINGS VERMIN AND WATER PROOF AND MAINTAIN FIRE RATING. USE SPECIFIED TECHNOLOGIES, INC. "SPECSEAL" SERIES LCI.
27. ALL PENETRATIONS IN FOUNDATION WALLS INCLUDING SLAB PENETRATIONS SHALL BE SUBSTANTIALLY SEALED BY UTILIZING A NON-CRACKING POLYURETHANE OR SIMILAR CAULK OR EQUIVALENT TO CLOSE OFF THE SOIL GAS ENTRY ROUTES. ALL CONDUITS IN THE SPACE BELOW THE FOUNDATION FLOOR WHICH PENETRATE THESE BARRIERS SHALL HAVE THREADED OR SOLVENTED FITTINGS.
28. ALL NEW RACEWAY, WIRING AND CABLE IN NEW AND EXISTING FINISHED SPACES SHALL BE RUN CONCEALED IN NEW AND EXISTING CONSTRUCTION UNLESS OTHERWISE INDICATED; CUT AND PATCH AS REQUIRED. PROVIDE PULLBOXES, SIZE AND TYPE AS REQUIRED.
29. EXPOSED RACEWAY, IF PERMITTED, SHALL BE RUN TRUE, PLUMB AND PARALLEL OR PERPENDICULAR TO BUILDING LINES. [RIGID METAL CONDUIT,] [EMT WITH RAINTIGHT STEEL FITTINGS,] 3/4 INCH MINIMUM, SHALL BE USED OUTDOORS; ELECTRICAL METALLIC TUBING, 3/4 INCH MINIMUM, SHALL BE USED IN INDOOR UNFINISHED SPACES; SURFACE METAL RACEWAY (WIREMOLD) SHALL BE USED IN INDOOR FINISHED SPACES.
30. ALL WIRING SHALL BE COPPER CONDUCTOR WITH 600 VOLTS INSULATION IN METAL RACEWAY WITH APPROVED FITTINGS UNLESS OTHERWISE INDICATED.
31. FEEDERS AND BRANCH CIRCUITS UNDERGROUND IN RACEWAY: TYPE THHN-THWN 90 DEGREE C
32. INTERIOR FEEDERS AND BRANCH CIRCUITS IN RACEWAY: TYPE THHN 90 DEGREE C.
33. FEEDERS SHALL BE MINIMUM #8 AWG; BRANCH CIRCUIT WIRING MINIMUM #12 AWG; CONTROL WIRING MINIMUM #14 AWG; UNLESS OTHERWISE INDICATED. FEEDER AND BRANCH CIRCUIT WIRING LARGER THAN #10 AWG SHALL BE STRANDED CONDUCTOR; #10 AWG AND SMALLER, STRANDED CONDUCTOR OR SOLID CONDUCTOR; CONTROL WIRING, STRANDED CONDUCTOR.
34. TAPS AND SPLICES FOR BRANCH CIRCUITS AND FEEDERS LARGER THAN #10 AWG SHALL BE MADE WITH BURNDY "INSUL-TAP" TYPE BIPC, OR APPROVED EQUAL, INSULATION PIERCING CONNECTORS OR BURNDY "HYLUG", OR APPROVED EQUAL, COMPRESSION SPLICES.
35. TAPS AND SPLICES FOR BRANCH CIRCUITS AND FEEDERS #10 AWG AND SMALLER SHALL BE MADE WITH IDEAL MODELS 410, 411 AND 412 CRIMP CONNECTORS, OR APPROVED EQUAL, WITH MODELS 415 OR 417 INSULATED CAPS.
36. BRANCH CIRCUIT AND FEEDER TAPS SHALL BE FULL CIRCUIT SIZE UP TO THEIR OVERCURRENT PROTECTION DEVICE.
37. STRANDED WIRING CONDUCTORS SHALL BE MADE UP TO SCREW TERMINALS WITH 3M, T&B OR PANDUIT LOCKING FORK CRIMP TERMINALS WITH NYLON INSULATED GRIPS.
38. CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION AND INSTALLATION DETAILS AND VERIFY ALL MANUFACTURER'S REQUESTS PRIOR TO ANY SUBMISSION FOR CONSIDERATION BY ENGINEER OR OWNER.
39. DO NOT INSTALL EXPOSED WIRING, OR CABLE NOT UL LISTED FOR THE PURPOSE; WOOD SUPPORTS OR ANCHORAGES; NONMETALLIC CONDUIT, BOXES OR FITTINGS; OR VINYL, PLASTIC, NYLON, OR OTHER COMBUSTIBLE OR SMOKE PRODUCING IDENTIFICATION OR CONSTRUCTION MATERIALS IN THE SPACE ABOVE HUNG CEILINGS USED AS A PLENUM FOR THE RETURN OF ENVIRONMENTAL AIR.
40. DEMONSTRATE PRODUCT CAPABILITY AND COMPLIANCE WITH REQUIREMENTS OF ALL ELECTRICAL DEVICES, EQUIPMENT AND SYSTEMS.
41. PERFORM MANUFACTURER'S RECOMMENDED TESTS AND SUBMIT RESULTS.
42. VERIFY PROPER ROTATION OF ALL ROTATING ELECTRICAL MACHINERY.
43. TEST GENERATORS, AND TRANSFER SWITCHES IN ACCORDANCE WITH APPLICABLE SECTIONS OF INTERNATIONAL ELECTRICAL TESTING ASSOCIATION ACCEPTANCE TESTING SPECIFICATIONS FOR ELECTRIC POWER DISTRIBUTION EQUIPMENT AND SYSTEMS NETA ATS-1999. PERFORM EACH VISUAL AND MECHANICAL INSPECTION AND ELECTRICAL TEST LISTED.
44. PROVIDE TWO SETS OF OPERATION AND MAINTENANCE MANUALS, BOUND AND INDEXED, WITH INSTRUCTIONS FOR ALL ELECTRICAL DEVICES, EQUIPMENT, APPLIANCES AND SYSTEMS.
45. PROVIDE ONE SET OF REPRODUCIBLE CONTRACT DRAWINGS, OR DIGITAL DATA FILES USING SAME SOFTWARE PROGRAM, VERSION, AND OPERATING SYSTEM AS CONTRACT DOCUMENTS, THAT HAVE BEEN REVISED AND ANNOTATED TO REFLECT THE AS-BUILT CONDITIONS OF THE PROJECT.
46. DELIVER CERTIFICATES OF ELECTRICAL AND OTHER INSPECTIONS, OR COPIES THEREOF, TO THE OWNER AT THE COMPLETION OF THE PROJECT WITH COPIES TO THE ENGINEER.
47. GUARANTEE ALL WORK IN WRITING TO THE OWNER AGAINST ANY AND ALL DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE AND PERFORM ALL CORRECTIVE WORK AT NO COST TO THE OWNER.
48. A CONTRACTOR MAKING A BID FOR WORK ON THIS PROJECT IS MADE AWARE BY THIS NOTE THAT IT IS THE INTENT OF THE OWNER TO HAVE A COMPLETELY INSTALLED JOB. THE CONTRACTOR MAKING A BID FOR THIS WORK WARRANTS THAT HE WILL COMPLETE AND WIRE, PROVIDING ALL NECESSARY ELECTRICAL WORK FOR EQUIPMENT SHOWN AND / OR DETAILED ON ANY PROJECT DRAWINGS OR SPECIFICATIONS AND NOT JUST THOSE COMMONLY REFERRED TO AS A SINGLE TRADE DRAWING UNLESS SPECIFICALLY IDENTIFIED ELSEWHERE AS WORK OF OTHER TRADES. WHERE EQUIPMENT REQUIRING WIRING IS SPECIFIED OR SHOWN ON DRAWINGS OTHER THAN ELECTRICAL DRAWINGS, OR INDICATED, OR IMPLIED, SUCH AS ON SHOP DRAWINGS SUBMITTED LATER, THE CONTRACTOR CAN AND SHALL REQUEST DIRECTION REGARDING CIRCUIT SIZING PROTECTION AND ROUTING WHERE NECESSARY BUT SHALL UNDERSTAND ALL NECESSARY WORK TO COMPLETE THE INSTALLATION SHALL BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER OR PROJECT.
49. UPON AWARD OF CONTRACT AND SUBSEQUENT APPROVAL OF SHOP DRAWINGS BY ENGINEER OF RECORD, THE CONTRACTOR SHALL FILL OUT AND FILE AIR PERMIT APPLICATIONS IN A TIMELY MANNER FOR GENERATORS. THE CONTRACTOR SHALL PAY ALL FEES FOR THE PERMITS AND INSPECTIONS. PROVIDE THE OWNER AND ENGINEER EACH WITH A COPY OF FILLED OUT FORMS PRIOR TO MAILING. CONTRACTOR MUST SECURE PERMIT PRIOR TO PROJECT CLOSEOUT. SEND FORMS ALONG WITH NJDEP'S REQUIRED FEE TO: NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ENERGY BUREAU OF SOURCE REVIEW, CN-27, TRENTON, NEW JERSEY 08625-0027. (1)

APPLICABLE CODES

1. THE NATIONAL ELECTRICAL CODE (NEC) 2011
2. INTERNATIONAL BUILDING CODE (IBC) 2009 NJ EDITION
3. NATIONAL ELECTRICAL SAFETY CODE (NESC)
4. NEW JERSEY UNIFORM FIRE CODE (NJUFC)
5. NEW JERSEY UNIFORM CONSTRUCTION CODE (NJUCC)
6. ACCESSIBLE & USABLE BUILDINGS & FACILITIES (ICC/ANSI A117.1)
7. NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA) STANDARD OF INSTALLATION.



ELECTRIC ONE-LINE DIAGRAM

NOT TO SCALE

ONE-LINE DIAGRAM KEY NOTES

1. BASIS OF DESIGN PRODUCT: NEW EXTERIOR WEATHERPROOF NEMA 3R, 3 POLE, ASCO 3000 SERIES AUTOMATIC TRANSFER SWITCH. PROVIDE LOCKING ENCLOSURE.
2. BASIS OF DESIGN PRODUCT: NEW KOHLER #80RZGD WITH #4R9X ALTERNATOR, WEATHERPROOF LEVEL 2 SOUND ENCLOSURE (67.5 dbA AT 23 FEET) AND INTERNAL CRITICAL SILENCER. PROVIDE ALTERNATOR STRIP HEATER, BLOCK HEATER, BATTERY HEATER AND CHARGER.
3. ONE SET OF 4#600 & 1#1/0 EG IN 4" UNDERGROUND CONDUIT TO NEW NEMA 3R AUTOMATIC TRANSFER SWITCH (ATS). REFER TO DRAWING E-101 FOR ROUTING. (1)
4. PROVIDE RELAYS, MODULES AND DRY CONTRACTS TO GENERATOR CONTROL SYSTEM FOR LOAD SHEDDING AND STAGGERED STARTUP OF MECHANICAL EQUIPMENT. PROVIDE ASCO ACCESSORIES AS REQUIRED.
5. EXISTING CONDUIT AND #600 KCMIL FEEDERS TO BE INTERCEPTED, REMOVED AND REROUTED AS REQUIRED. FIELD COORDINATE EXACT FEEDER SIZES AND QUANTITIES. (1)
6. TWO (2) 1" EMPTY CONDUITS FOR GENERATOR CONTROL WIRING PER MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS.
7. TO HEATERS AND BATTERY CHARGER. SEE PANEL SCHEDULE FOR BRANCH CIRCUIT WIRING.
8. CONTRACTOR SHALL COORDINATE SERVICE SHUTDOWN WITH PSE&G AT LEAST 4 WEEKS IN ADVANCE. CONTACT PSE&G CONSTRUCTION SERVICES AT (800) 782-0067 TO MAKE ALL REQUIRED ARRANGEMENTS.

DRAWING NUMBER	DRAWING LIST
E-001	ELECTRICAL SYMBOLS, NOTES AND ONE-LINE DIAGRAM
E-100	ELECTRICAL SITE PLAN AND DETAILS
E-101	ELECTRICAL FLOOR PLAN
E-200	PANEL SCHEDULES
E-300	SPECIFICATIONS
E-301	SPECIFICATIONS (CONTINUED)

POWER DEVICE LEGEND

SYMBOLS	DESCRIPTION
	SURFACE MOUNTED PANELBOARD, POWER AND LIGHTING
	RECESSED PANELBOARD, POWER AND LIGHTING
	HOMERUN TO PANELBOARD
J	JUNCTION BOX - WALL MOUNTED
J	JUNCTION BOX - CEILING MOUNTED
P	POWER FEED TO SYSTEM FURNITURE, WALL MOUNTED. PROVIDE FLEXIBLE WHIP CONNECTION TO THE FURNITURE AS REQUIRED.
M	MOTOR
X/Y/Z	DISCONNECT SWITCH. "X" INDICATES SWITCH SIZE, "Y" INDICATES NUMBER OF POLES, "Z" INDICATES FUSE SIZE (NF = NON-FUSED).
X/Y/Z	COMBINATION MAGNETIC MOTOR STARTER AND DISCONNECT SWITCH. "X" INDICATES SWITCH SIZE, "Y" INDICATES NUMBER OF POLES, "Z" INDICATES FUSE SIZE (NF = NON-FUSED).
T	MANUAL MOTOR STARTER WITH THERMAL OVERLOADS.
	PUSH BUTTON
E	EMERGENCY PUSH BUTTON

ABBREVIATIONS

A	AMPERE	GND, G	GROUND
AFF	ABOVE FINISHED FLOOR	IC	INTERRUPTING CAPACITY
AFG	ABOVE FINISHED GRADE	IG	ISOLATED GROUND
C	CONDUIT(S)	IL	INTERLOCKED
CB	CIRCUIT BREAKER	MC	MECHANICAL CONTRACTOR
CH	COUNTER HEIGHT	MOD	MOTOR OPERATED DAMPER
CO	CONDUIT ONLY	NIC	NOT IN CONTRACT
CT	CURRENT TRANSFORMER	NL	NIGHT LIGHT
CU	COPPER	NTS	NOT TO SCALE
EC	ELECTRICAL CONTRACTOR	RGS	RIGID GALVANIZED STEEL
EG	EQUIPMENT GROUND	SPD	SURGE PROTECTIVE DEVICE
EM	EMERGENCY	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
EMT	ELECTRICAL METALLIC TUBING	T/C	TIME CLOCK
ETR	EXISTING TO REMAIN	UON	UNLESS OTHERWISE NOTED
EWC	ELECTRIC WATER COOLER	V	VOLTS
FA	FIRE ALARM	W	WALL MOUNTED
FBO	FURNISHED BY OTHERS	WP	WEATHERPROOF
GFI	GROUND FAULT INTERRUPTER		

DEVICE LEGEND NOTES:

1. SYMBOLS ARE INDICATED FOR GENERAL REFERENCE ONLY. THE PRESENCE OF A SYMBOL DOES NOT INDICATE ITS USE ON THIS PROJECT. REFER TO PLAN DRAWINGS FOR SPECIFIC SYMBOLS USED.

No.	Date	Revision	Revised By	Checked By
1	6-25-15	ADDENDA NO. 1	AMP	AMP

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ELECTRICAL SYMBOLS, NOTES AND SINGLE LINE DIAGRAM

HOUSING AUTHORITY CITY OF PERTH AMBOY

STANDYBY GENERATOR INSTALLATION

881 AMBOY AVENUE
PERTH AMBOY, NJ 08862

PERTH AMBOY
MONMOUTH COUNTY NEW JERSEY

DATE:	DESIGNED BY:	SCALE:	PROJECT NUMBER:
06/03/2015	AMP	AS NOTED	6805.001
DRAWN BY:	CHECKED BY:	FIELD BOOK	SHEET:
AMP	AHG		E-001

O:\6K6805\6805 - Perth Administration Building\6805.001 - Generator Relocation\CAD\DWG\6805.001 - E001.dwg E-001

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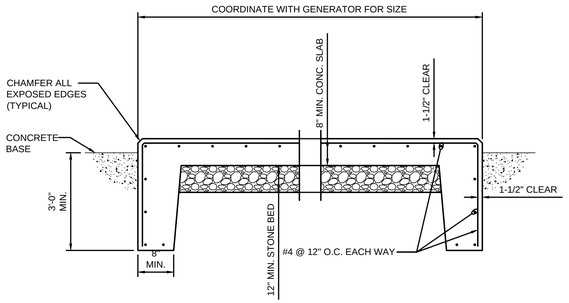
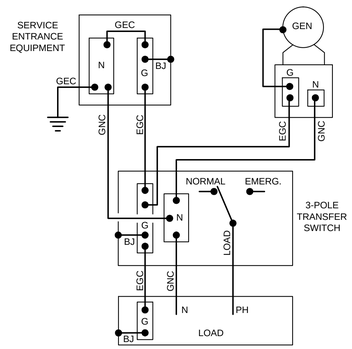


NOTES:

1. GENERAL: ALL MATERIALS SHALL BE IN CONFORMITY WITH "ACI BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE"; LATEST EDITION.
   - PORTLAND CEMENT: APPROVED BRAND ASTM SPECIFICATIONS C-150 TYPE I. TO BE 3500 PSI AT 28 DAYS.
   - REINFORCING BARS TO BE ASTM A-615.
   - COARSE AGGREGATE: HARD, DURABLE, CLEAN UNCOATED CRUSHED STONE OR GRAVEL ASTM SPECIFICATIONS C-33.
   - SAND: CLEAN, HARD, DURABLE, UNCOATED GRAINS FREE FROM SILT, LOAM, CLAY OR OTHER DELETERIOUS SUBSTANCES. ASTM SPECIFICATION C-33
   - WATER: CLEAN AND FREE FROM DELETERIOUS SUBSTANCES.
2. PAD DIMENSIONS SHALL BE SIZED ACCORDING TO GENERATOR MANUFACTURER'S REQUIREMENTS. PAD SHALL EXTEND 12" BEYOND THE FOOTPRINT OF THE GENERATOR ENCLOSURE.

GENERATOR PAD DETAIL

NOT TO SCALE



LEGEND

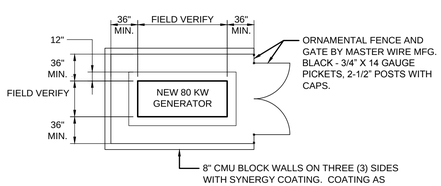
BJ	=	BONDING JUMPER
EGC	=	EQUIPMENT GROUNDING CONDUCTOR
G	=	GROUND BLOCK
GEC	=	GROUNDING ELECTRODE CONDUCTOR
GNC	=	GROUNDED NEUTRAL CONDUCTOR
N	=	NEUTRAL BLOCK
PH	=	PHASE CONDUCTORS

NOTES:

1. DETAIL IS TYPICAL AND IS INTENDED TO ILLUSTRATE METHODS OF GROUNDING AND BONDING OF ELECTRICAL DISTRIBUTION SYSTEM COMPONENTS.
2. BONDING JUMPERS (BJ), GROUNDING ELECTRODE CONDUCTORS (GEC), GROUNDED NEUTRAL CONDUCTORS (GNC), AND EQUIPMENT GROUNDING CONDUCTORS (EGC) SHALL ALL BE INSULATED. BONDING JUMPERS (BJ) MAY BE BARE WHEN WITHIN AN ENCLOSURE OR LESS THAN 6'-0" IN LENGTH. INSULATION COLORS SHALL BE AS FOLLOWS:
   a. BJ: GREEN
   b. GEC: GREEN
   c. GNC: WHITE
   d. EGC: GREEN
3. REFER TO NATIONAL ELECTRICAL CODE "GROUNDING ELECTRODE CONDUCTORS" TABLE (2008 NEC 250.66) AND "EQUIPMENT GROUNDING CONDUCTORS" TABLE (2008 NEC 250.122) FOR SIZING OF GROUNDING AND BONDING CONDUCTORS INDICATED ABOVE.

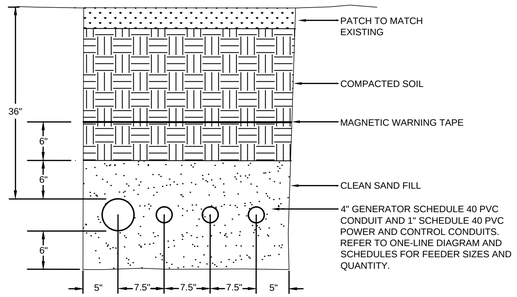
NON SEPARATELY DERIVED GENERATOR SYSTEM WITH 3-POLE ATS

NOT TO SCALE


36" MIN.
FIELD VERIFY
36" MIN.
12"
36" MIN.
FIELD VERIFY
36" MIN.
NEW 80 KW GENERATOR
ORNAMENTAL FENCE AND GATE BY MASTER WIRE MFG. BLACK - 3/4" X 14 GAUGE PICKETS, 2-1/2" POSTS WITH CAPS.
8" CMU BLOCK WALLS ON THREE (3) SIDES WITH SYNERGY COATING. COATING AS SELECTED BY OWNER.

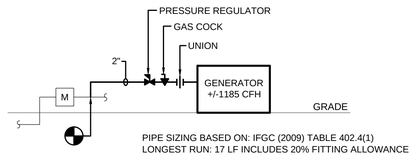
GENERATOR SURROUND ENCLOSURE DETAIL

NOT TO SCALE



GENERATOR DUCTBANK DETAIL

NOT TO SCALE

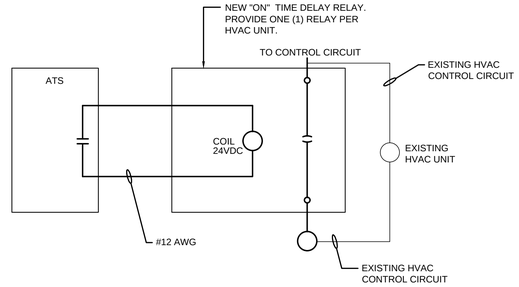


PIPE SIZING BASED ON: IFGC (2009) TABLE 402.4(1)
LONGEST RUN: 17 LF INCLUDES 20% FITTING ALLOWANCE

GAS RISER DIAGRAM

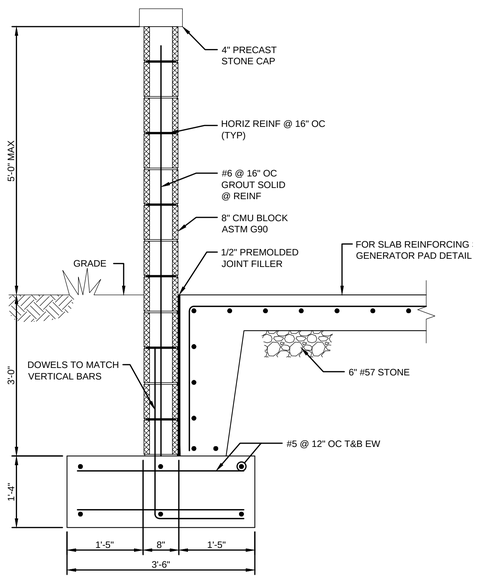
NOT TO SCALE

NOTE: THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK RELATING TO GENERATORS INCLUDING ALL GAS PIPING AND CONNECTIONS.



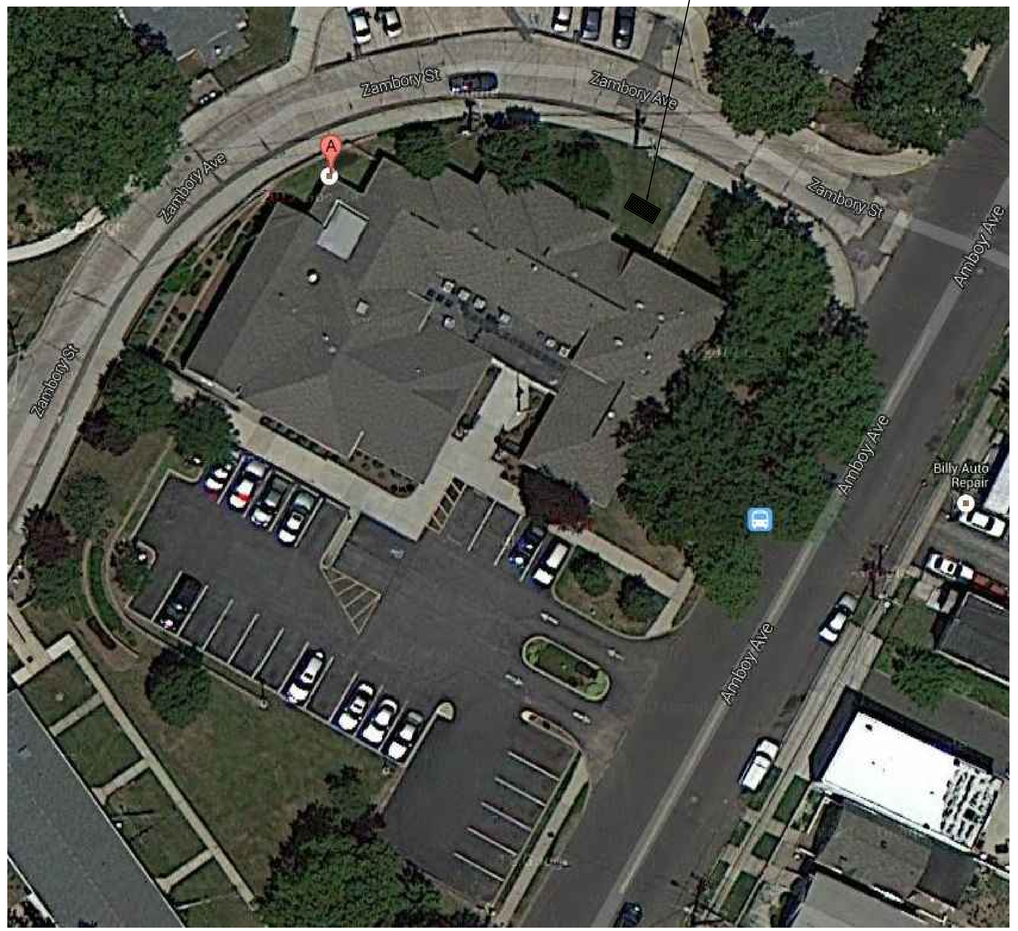
TYPICAL LOAD SHED RELAY DETAIL

NOT TO SCALE



GENERATOR SURROUND FOUNDATION DETAIL

NOT TO SCALE



SITE PLAN

NOT TO SCALE

SITE PLAN KEY NOTES

1. PROPOSED GENERATOR LOCATION. FIELD COORDINATE EXACT PLACEMENT PRIOR TO CONSTRUCTING NEW PAD. COORDINATE PAD INSTALLATION WITH SLOPE OF GRADE AND INCREASE PAD DEPTH AS REQUIRED TO ACCOMMODATE SLOPE.

No.	Date	Revision	Revised By	Checked By

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ELECTRICAL SITE PLAN AND DETAILS

HOUSING AUTHORITY CITY OF PERTH AMBOY

STANDYBY GENERATOR INSTALLATION

881 AMBOY AVENUE
PERTH AMBOY, NJ 08862

PERTH AMBOY
MONMOUTH COUNTY NEW JERSEY

DATE:	DESIGNED BY:	SCALE:	PROJECT NUMBER:
06/03/2015	AMP	AS NOTED	6805.001
DRAWN BY:	CHECKED BY:	FIELD BOOK	SHEET:
AMP	AHG		E-100

O:\EK6805\6805 - Perth Administration Building\6805.001 - Generator Relocation\CAD\DWG\6805.001 - E100.dwg E-100

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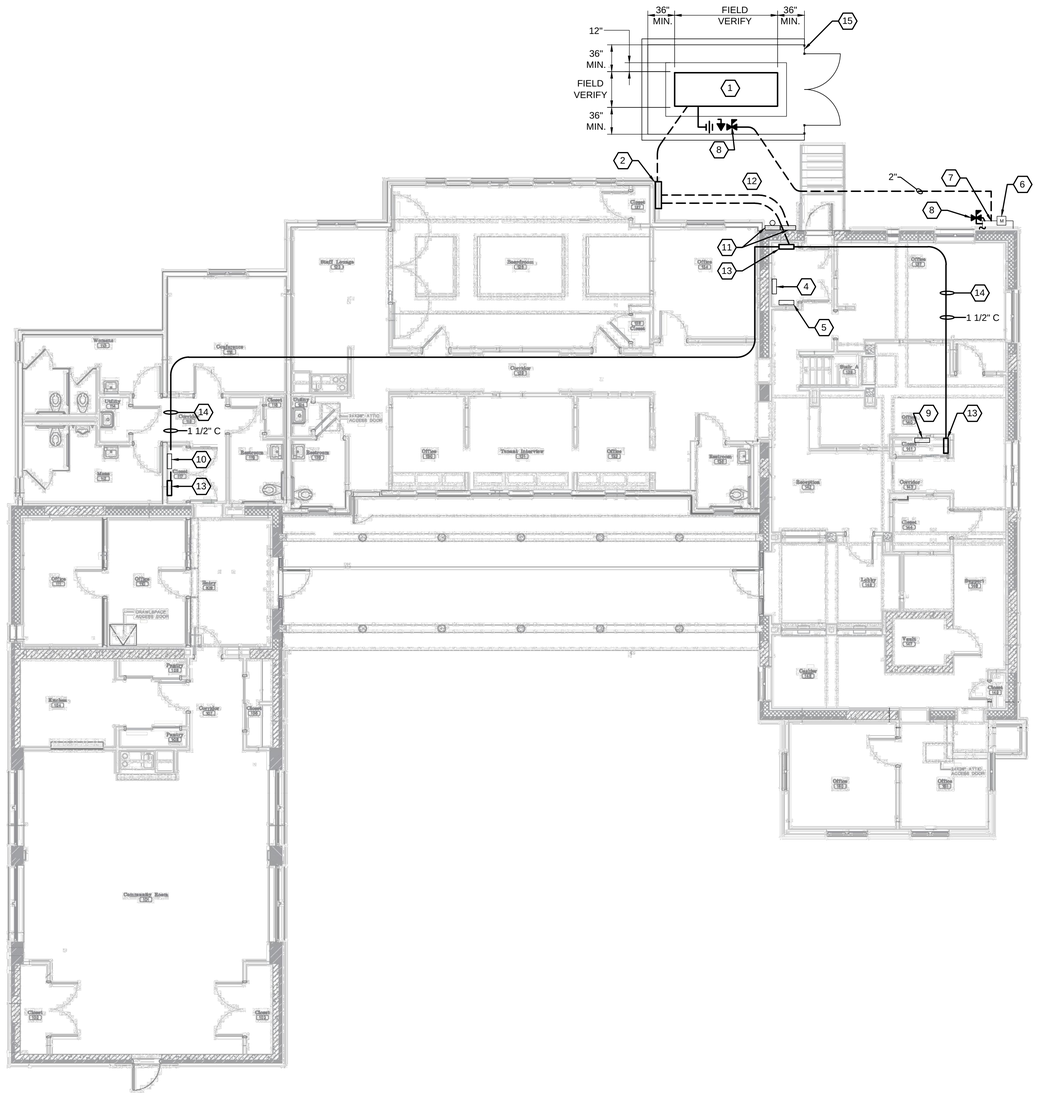
36" MIN.
FIELD VERIFY
36" MIN.
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FIELD VERIFY
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13
9
13
Waiting
Reception
Staff Lounge
Conference
Closet
Storage
Kitchen
Corridor
Toilet
Toilet
Janitor
Closet
Vestibule
Toilet
Toilet
Mech. Room
Office
Office
Office

EXISTING MDP

(EXISTING)

JOB NAME: PERTH AMBOY GENERATOR
RATING: 208/120V, 4W, 3PH, 400A

JOB NO. 6805.001
LOCATION: EXTERIOR OF BUILDING

CKT. NO.	CIRCUIT DESCRIPTION	POLE	LOAD KVA	BKR.	BRANCH CIRCUIT	A	B	C	BRANCH CIRCUIT	BKR.	LOAD KVA	POLE	CIRCUIT DESCRIPTION	CKT. NO.
1						0.0								2
3	SPACE	3			EXISTING		0.0					3		4
5								0.0						6
7						0.0								8
9	EXISTING LOAD	3		225	EXISTING		0.0					3		10
11								0.0						12
13						0.0								14
15	EXISTING LOAD	3		225	EXISTING		0.0		EXISTING	225		3	EXISTING LOAD	16
17								0.0						18
	HIGHEST PEAK DEMAND KW PER PSE&G FROM JULY 2013		15.5			15.5								20
			15.5				15.5							22
			15.5					15.5						24
					TOTAL (PHASE):	15.5	15.5	15.5						

PANEL TYPE: NEMA 3R
MOUNTING: SURFACE
MAIN CIRCUIT BREAKER: 400A
INTERRUPTING RATING: EXISTING KA SYM.
FED FROM: UTILITY TRANSFORMER

NOTES
1. EXISTING NEMA 3R SQUARE D I-LINE PANELBOARD. FIELD VERIFY EXACT BRANCH BREAKER SIZES AND SHORT CIRCUIT RATING.
2. BOLT ON BREAKERS ONLY
3. CONTRACTOR IS RESPONSIBLE TO COORDINATE THE SHORT CIRCUIT RATING PRIOR TO PURCHASING ANY EQUIPMENT.
4. ALL WIRE SIZES ARE BASED ON 75 DEGREE WIRE.

EXISTING PANEL P-1

(EXISTING)

JOB NAME: PERTH AMBOY HA
RATING: 240/120V, 3W, 1PH, 225A

JOB NO. 6805.001
LOCATION: MAIN ELECTRIC CLOSET

CKT. NO.	CIRCUIT DESCRIPTION	POLE	LOAD KVA	BKR.	BRANCH CIRCUIT	A	B	BRANCH CIRCUIT	BKR.	LOAD KVA	POLE	CIRCUIT DESCRIPTION	CKT. NO.
1	PHONE OUTLET	1		20	EXISTING	0.0		EXISTING	20		1	INSTA HOT HEATER	2
3	ALARM	1		20	EXISTING		0.0	EXISTING	40		2	AC-2	4
5	AC-1	2		40	EXISTING	0.0							6
7							0.0	EXISTING	20		1	HEATER #2	8
9	HEATER #1A	1		20	EXISTING	0.0		EXISTING	20		1	BOARD ROOM RECEPT	10
11	EM LTG CORRIDOR	1		20	EXISTING		0.0	EXISTING	20		1	OFFICE RECEPTACLES	12
13	CORRIDOR LIGHTING	1		20	EXISTING	0.0		EXISTING	30		2	RANGE	14
15	STAFF LOUNG LIGHTING	1		20	EXISTING		0.0						16
17	OFFICE LIGHTING	1		20	EXISTING	0.0		EXISTING	20		1	LIGHTING	18
19	OFFICE LIGHTING	1		20	EXISTING		0.0	EXISTING	20		1	MICROWAVE	20
21	OFFICE LIGHTING	1		20	EXISTING	0.0		EXISTING	20		1	EXISTING LOAD	22
23	BOARD LIGHTING	1		20	EXISTING		0.0	EXISTING	20		1	OFFICE LIGHTING	24
25	BOARD LIGHTING	1		20	EXISTING	0.0		EXISTING	20		1	CASHIER RECEPTACLE	26
27	OFFICE LIGHTING	1		20	EXISTING		0.0	EXISTING	20		1	COPIER RECEPTACLE	28
29	CASHIER LIGHTING	1		20	EXISTING	0.0		EXISTING	20		1	EXISTING LOAD	30
31	CORRIDOR LIGHTING	1		20	EXISTING		0.0	EXISTING	20		1	EXISTING LOAD	32
33	OFFICE LIGHTING	1		20	EXISTING	0.0		EXISTING	20		1	EXISTING LOAD	34
35	EM / EXIT LIGHTING	1		20	EXISTING		0.0	EXISTING	ST	1.0	2	PANEL L-1 (NOTE 5)	36
37	OFFICE LIGHTING	1		20	EXISTING	2.5				2.5			38
39	WATER HEATER	2		40	EXISTING		0.0	EXISTING	40		2	CRAWL SPACE HEATER	40
41							0.0						42
					TOTAL (PHASE):	2.5	0.0						

PANEL TYPE: NEMA 1
MOUNTING: SURFACE
MAIN CIRCUIT BREAKER: 200A
INTERRUPTING RATING: EXISTING KA SYM.
FED FROM: MDP

NOTES
1. EXISTING CUTLER HAMMER TYPE PB PANELBOARD. EXISTING MCB SHORT CIRCUIT RATING 10KA RMS SYM AMPS
2. BOLT ON BREAKERS ONLY
3. CONTRACTOR IS RESPONSIBLE TO COORDINATE THE SHORT CIRCUIT RATING PRIOR TO PURCHASING ANY EQUIPMENT.
4. ALL WIRE SIZES ARE BASED ON 75 DEGREE WIRE.
5. FIELD VERIFY BREAKER SIZE

EXISTING PANEL P-2

(EXISTING)

JOB NAME: PERTH AMBOY HA
RATING: 240/120V, 3W, 1PH, 225A

JOB NO. 6805.001
LOCATION: STORAGE CLOSET

CKT. NO.	CIRCUIT DESCRIPTION	POLE	LOAD KVA	BKR.	BRANCH CIRCUIT	A	B	BRANCH CIRCUIT	BKR.	LOAD KVA	POLE	CIRCUIT DESCRIPTION	CKT. NO.
1	WATER HEATER	2		40	EXISTING	0.0		EXISTING	40		2	ACC-7	2
3							0.0	EXISTING	20		1	RECEPTACLES	4
5	AC CONDENSER	2		40	EXISTING	0.0		EXISTING	20		1	RECEPTACLES	6
7							0.0	EXISTING	20		1	RECEPTACLES	8
9	AHU-7	1		20	EXISTING	0.0		EXISTING	20		1	FURNACE	10
11	VAV BOXES	1		20	EXISTING		0.0	EXISTING	20		1	RECEPTACLES	12
13	ACC-2	2		30	EXISTING	0.0		EXISTING	20		1	RECEPTACLES	14
15							0.0	EXISTING	20		1	LIGHTING	16
17	KITCHEN RECEPTACLES	1		20	EXISTING	0.0		EXISTING	20		1	RECEPTACLES	18
19	KITCHEN RECEPTACLES	1		20	EXISTING		0.0	EXISTING	20		1	RECEPTACLES	20
21	KITCHEN RECEPTACLES	1		20	EXISTING	0.0		EXISTING	20		1	RECEPTACLES	22
23	KITCHEN LIGHTING	1		20	EXISTING		0.0	EXISTING	20		1	BATHROOM	24
25	ALARM	1		20	EXISTING	0.0		EXISTING	20		1	OFFICE LIGHTING	26
27	EXISTING LOAD	1		20	EXISTING		0.0	EXISTING	20		1	ENTRY LIGHTING	28
29	SITE LIGHTING	2		20	EXISTING	0.0		EXISTING	20		1	RECEPTACLES	30
31							0.0	EXISTING	20		1	RECEPTACLES	32
33	REFRIGERATOR	1		20	EXISTING	0.0		EXISTING	20		1	CANOPY LIGHTING	34
35	ELECTRIC STOVE	2		40	EXISTING		0.0	EXISTING	20		1	LIGHTING	36
37						0.0		EXISTING	20		1	DOWNLIGHTING	38
39	SPARE	1		20			0.0	EXISTING	50		2	ACC-3	40
41	SPARE	1		20		0.0							42
					TOTAL (PHASE):	0.0	0.0						

PANEL TYPE: NEMA 1
MOUNTING: SURFACE
MAIN CIRCUIT BREAKER: 200A
INTERRUPTING RATING: EXISTING KA SYM.
FED FROM: FIELD VERIFY

NOTES
1. EXISTINGCUTLER HAMMER TYPE PB PANELBOARD.
2. BOLT ON BREAKERS ONLY
3. CONTRACTOR IS RESPONSIBLE TO COORDINATE THE SHORT CIRCUIT RATING PRIOR TO PURCHASING ANY EQUIPMENT.
4. ALL WIRE SIZES ARE BASED ON 75 DEGREE WIRE.
5. FIELD VERIFY BREAKER SIZE

EXISTING PANEL L-1

(EXISTING)

JOB NAME: PERTH AMBOY HA
RATING: 240/120V, 3W, 1PH, 100A

JOB NO. 6805.001
LOCATION: MAIN ELECTRIC CLOSET

CKT. NO.	CIRCUIT DESCRIPTION	POLE	LOAD KVA	BKR.	BRANCH CIRCUIT	A	B	BRANCH CIRCUIT	BKR.	LOAD KVA	POLE	CIRCUIT DESCRIPTION	CKT. NO.
1	OFFICE AND ATTIC LTG	1		20	EXISTING	0.0		EXISTING	30		1	RECEPTACLES	2
3	EMERGENCY LIGHTING	1		20	EXISTING		0.0	EXISTING	20		1	RECEPTACLES	4
5	EXISTING LOAD	1		20	EXISTING	0.0		EXISTING	20		1	LIGHTING	6
7	GENERATOR BLOCK HEATER (NOTE 5)	1	1.5	20	2#12 & 1#12EG IN 3/4"C		1.5	EXISTING	20		1	RECEPTACLES	8
9	GENERATOR BATTERY CHARGER-HEATER (NOTE 5)	1	1.0	20	2#12 & 1#12EG IN 3/4"C	1.0		EXISTING	20		1	LIGHTING	10
11	ALTERNATOR HEATER (NOTE 5)	1	1.0	20	2#12 & 1#12EG IN 3/4"C		1.0						12
13	SPACE	1				0.0					1	SPACE	14
15	SPACE	1					0.0				1	SPACE	16
17	SPACE	1				0.0					1	SPACE	18
19	SPACE	1					0.0				1	SPACE	20
21	SPACE	1				0.0					1	SPACE	22
23	SPACE	1					0.0				1	SPACE	24
					TOTAL (PHASE):	1.0	2.5						

PANEL TYPE: NEMA 1
MOUNTING: SURFACE
MAIN LUGS ONLY
INTERRUPTING RATING: EXISTING KA SYM.
FED FROM: EXISTING PANEL P-1

NOTES
1. EXISTING SQUARE D QO LOADCENTER. EXISTING MCB SHORT CIRCUIT RATING 10KA RMS SYM AMPS
2. BOLT ON BREAKERS ONLY
3. CONTRACTOR IS RESPONSIBLE TO COORDINATE THE SHORT CIRCUIT RATING PRIOR TO PURCHASING ANY EQUIPMENT.
4. ALL WIRE SIZES ARE BASED ON 75 DEGREE WIRE.
4. PROVIDE NEW BREAKER IN EXISTING SPACE

EXISTING PANEL L-4

(EXISTING)

JOB NAME: PERTH AMBOY GENERATOR
RATING: 208/120V, 4W, 3PH, 225A

JOB NO. 6805.001
LOCATION: STORAGE CLOSET

CKT. NO.	CIRCUIT DESCRIPTION	POLE	LOAD KVA	BKR.	BRANCH CIRCUIT	A	B	C	BRANCH CIRCUIT	BKR.	LOAD KVA	POLE	CIRCUIT DESCRIPTION	CKT. NO.
1	LIGHTING	1		20	EXISTING	0.0			EXISTING	20		1	LIGHTING	2
3	LIGHTING	1		20	EXISTING		0.0		EXISTING	20		1	KEF-1	4
5	CONDENSING UNIT ACC-4	2		20	EXISTING			0.0	EXISTING	20		1	FURNACE (AH-4)	6
7						0.0			EXISTING	20		1	OUTDOOR LIGHTING	8
9	RECEPTACLES	1		20	EXISTING		0.0		EXISTING	20		1	LIGHTING CONTACTOR	10
11	RECEPTACLES	1		20	EXISTING			0.0	EXISTING	20		1	OFFICE REECPTACLES	12
13	COMPUTER RECEPTACLES	1		20	EXISTING	0.0			EXISTING	20		1	EXIT LIGHTING	14
15	COMPUTER RECEPTACLES	1		20	EXISTING		0.0		EXISTING	20		1	RECEPTACLES	16
17	WATER COOLER	1		20	EXISTING			0.0	EXISTING	20		1	COPIER	18
19	COMPUTER RECEPTACLES	1		20	EXISTING	0.0								20
21	COMPUTER RECEPTACLES	1		20	EXISTING		0.0		EXISTING	20		1	ACC UNIT	22
23	OFFICE LTG AND RECEPTACLES	1		20	EXISTING			0.0						24
25	COMPUTER RECEPTACLES	1		20	EXISTING	0.0			EXISTING	20		1	RECEPTACLES	26
27	EXISTING LOAD	1		20	EXISTING		0.0		EXISTING	20		1	AHU UNIT	28
29	COMPUTER RECEPTACLES	1		20	EXISTING			0.0	EXISTING	20		1	RECEPTACLES	30
31	RECEPTACLES	1		20	EXISTING	0.0			EXISTING	20		1	RECEPTACLES	32
33	RECEPTACLES	1		20	EXISTING		0.0		EXISTING	20		1	RECEPTACLES	34
35	EXISTING LOAD	2		20	EXISTING			0.0	EXISTING	20		1	LIGHTING	36
37						0.0								38
39	SPACE	1					0.0		EXISTING	20		2	ROOFTOP UNIT (RTU)	40
41	SPACE	1						0.0						42
					TOTAL (PHASE):	0.0	0.0	0.0						

PANEL TYPE: NEMA 1
MOUNTING: SURFACE
MAIN CIRCUIT BREAKER: 150A
INTERRUPTING RATING: 10KA SYM.
FED FROM: MDP

NOTES
1. EXISTING SQUARE D TYPE NQOD, E2 SERIES PANELBOARD. EXISTING MCB SHORT CIRCUIT RATING 10KA RMS SYM AMPS
2. BOLT ON BREAKERS ONLY
3. CONTRACTOR IS RESPONSIBLE TO COORDINATE THE SHORT CIRCUIT RATING PRIOR TO PURCHASING ANY EQUIPMENT.
4. ALL WIRE SIZES ARE BASED ON 75 DEGREE WIRE.

KEY NOTES

1. FURNISH AND INSTALL RELAYS AND DRY CONTACTS AS REQUIRED FOR LOAD SHEDDING OF AIR CONDITIONING/HVAC EQUIPMENT PRIOR TO STARTUP. COORDINATE EXACT REQUIREMENTS WITH THE EQUIPMENT VENDOR OR MANUFACTURER. FIELD COORDINATE EXACT LOCATIONS OF EXISTING EQUIPMENT IN THE FIELD.

2. FIELD VERIFY EXISTING LOAD. IF SERVES CONDENSING UNIT OR PACKAGED HVAC EQUIPMENT, PROVIDE RELAY AND DRY CONTACTS FOR LOAD SHED.

No.	Date	Revision	Revised By	Checked By
1	6-25-15	ADDENDA NO. 1	AMP	AMP

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ELECTRICAL
PANEL SCHEDULES

HOUSING AUTHORITY CITY OF PERTH AMBOY

STANDYBY GENERATOR INSTALLATION

881 AMBOY AVENUE
PERTH AMBOY, NJ 08862

PERTH AMBOY
MONMOUTH COUNTY NEW JERSEY

DATE:	DESIGNED BY:	SCALE:	PROJECT NUMBER:
06/03/2015	AMP	AS NOTED	6805.001
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ELECTRICAL SPECIFICATIONS

1. PATCHING AND CUTTING

   A. PERFORM ALL CUTTING, FITTING AND PATCHING WORK THAT MAY BE REQUIRED BY ITS WORK AND AS SHOWN OR REASONABLY IMPLIED BY THE DRAWINGS AND NOTES.

   B. ALL DAMAGED AREAS AND EXISTING AREAS EFFECTED BY DEMOLITION OR NEW CONSTRUCTION WORK SHOWN ON DRAWINGS SHALL BE PATCHED AS REQUIRED TO MATCH IMMEDIATE EXISTING ADJACENT AREAS IN MATERIAL, FIRE RATING, FINISH COLOR, UNLESS OTHERWISE NOTED.

   C. THE ELECTRICAL CONTRACTOR IS TO REPLACE THE INTEGRITY OF RATED PARTITIONS, COLUMNS AND BEAM FIREPROOFING EFFECTED BY ITS WORK. REPLACEMENT TO COMPLY WITH LOCAL CODES.

   D. PROVIDE SUPPORTS TO ASSURE STRUCTURAL INTEGRITY OF SURROUNDINGS, DEVICES AND METHODS TO PROTECT OTHER PORTIONS OF PROJECT FROM DAMAGE.

   E. EXECUTE WORK BY METHODS TO AVOID DAMAGE TO OTHER WORK, AND WHICH WILL PROVIDE PROPER SURFACES TO RECEIVE PATCHING AND FINISHING.

3. GENERAL

   A. FURNISH AND INSTALL ALL ELECTRICAL WORK AS SHOWN ON THE DRAWINGS AND THESE SPECIFICATIONS HEREIN. WORK INCLUDES THE FOLLOWING UNDERSTANDINGS:

      a. CONTRACT DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO OUTLINE BASIC ENGINEERING AND SYSTEMS DESIGN, THEREFORE DO NOT SHOW MINOR DETAILS AND ACCESSORIES. BECAUSE A MINOR COMPONENT IS NOT SHOWN, SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR FURNISHING AND INSTALLING ALL SUCH ITEMS NECESSARY TO PROVIDE COMPLETE, OPERATIVE AND PROPERLY INSTALLED SYSTEMS TO THE OWNER, UNDER THE BASIC CONTRACT. IF THERE ARE ANY DOUBTS AS TO WORK REQUIRED, THE CONTRACTOR SHALL OBTAIN A CLARIFICATION FROM THE ENGINEER IN THE BID STAGE.

      b. THE CONTRACT DRAWINGS SHOW THE INTENDED LOCATION OF THE EQUIPMENT, HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY MINOR ADJUSTMENTS OR RELOCATIONS NECESSARY DUE TO CHOICE OF EQUIPMENT AND COORDINATION CONFLICTS. ALL EQUIPMENT RELOCATIONS MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

      c. THE PROJECT DRAWINGS, THIS SPECIFICATION, AND OTHER RELATED DOCUMENTS ARE COMPLEMENTARY. ITEMS REQUIRED BY ONE SHALL DESIGNATE REQUIREMENT BY THE OTHER, WHETHER EXPLICITLY STATED OR NOT. WHERE DOCUMENTS CONFLICT, THE WORK OF THE MORE STRINGENT NATURE SHALL BE REQUIRED.

      d. COOPERATION AND COORDINATION WITH UTILITIES, OWNER, AND OTHER SUBCONTRACTORS IS MANDATORY.

      e. EXISTING WORK AND UTILITIES WHICH ARE DAMAGED OR DISTURBED DUE TO ANY PHASE OF OPERATIONS, SHALL BE RESTORED TO THE SATISFACTION OF FPA, THE OWNER, AND THE GOVERNING AUTHORITIES.

      f. PROCUREMENT AND INSTALLATION OF MATERIALS, PRODUCTS AND EQUIPMENT SHALL BE COORDINATED WITH THE WORK OF THE OTHER TRADES, INCLUDING ALL WORK SHOWN ON THE PLUMBING, ELECTRICAL, FIRE PROTECTION, AND ARCHITECTURAL DRAWINGS.

   B. CLEARANCES FOR WORKING SPACE AND MAINTENANCE SHALL BE MAINTAINED AS REQUIRED BY CODE AND/OR MANUFACTURER'S REQUIREMENT, WHICHEVER IS MORE STRINGENT.

   C. "PROVIDE" AND/OR "FURNISH AND INSTALL" MEANS PURCHASE, ARRANGE DELIVERY, UNLOAD, INSTALL, CONNECT, TEST, AND LEAVE READY FOR OPERATION.

   D. THE WORK CALLED FOR ON THE DRAWINGS AND SPECIFICATIONS HEREIN SHALL BE COORDINATED WITH THE STRUCTURE AND WORK OF ALL OTHER TRADES AND SHALL BE SO ARRANGED THAT THERE WILL BE NO DELAY IN THE PROPER INSTALLATION AND COMPLETION OF ANY PART OR PARTS OF EACH PERSPECTIVE WORK WHEREIN IT MAY BE INTERRELATED WITH THAT OF THIS CONTRACT SO THAT GENERALLY ALL WORK CAN PROCEED IN ITS NATURAL SEQUENCE WITHOUT UNNECESSARY DELAY.

   E. REFER TO OTHER ENGINEERING DRAWINGS FOR ALL NECESSARY FIRE DAMPERS, ALARMS, SMOKE DETECTORS, AND FIRE COMMUNICATIONS EQUIPMENT AND INSTALL PER ALL APPLICABLE CODES, AGENCIES, AND LOCAL LAWS.

   F. WHERE EXISTING POWER CIRCUITS HAVE BEEN DISTURBED, ALL COSTS FOR RECIRCUITING OF SAME IS TO BE INCLUDED.

   G. SHOP DRAWINGS AND DATA SHEETS ARE REQUIRED FOR ASSEMBLIES AND EQUIPMENT. THEY SHALL PROVIDE ALL PERTINENT DATA AND INFORMATION NECESSARY TO EVALUATE EACH ITEM. IRRELEVANT INFORMATION ON DRAWINGS AND DATA SHEETS SHALL BE COMPLETELY MARKED OUT LEAVING ONLY DATA THAT PERTAINS TO THE ITEMS SUBMITTED FOR APPROVAL. DRAWINGS AND DATA SHEETS SHALL SHOW:

      a. PRINCIPAL DIMENSIONS AND DETAILS OF CONSTRUCTION.

      b. WEIGHTS OF PRINCIPAL PARTS AND TOTAL WEIGHTS WITH INFORMATION REQUIRED FOR THE DESIGN OF SUPPORTS AND FOUNDATIONS.

      c. PERFORMANCE DATA.

      d. UNDERWRITERS LABEL AND OTHER AUTHORITIES HAVING JURISDICTION OF EQUIPMENT REQUIRING LABELS.

      e. ALL MANUFACTURER'S TEST REPORTS THAT MAY HAVE BEEN CONDUCTED AT THE FACTORY ON TRANSFORMERS, AND INSULATION TESTS ON MEDIUM VOLTAGE CABLE INCLUDING HIGH POTENTIAL POWER AND POWER FACTOR TEST RESULTS.

      f. CERTIFIED PERFORMANCE GUARANTEES.

   I. ALL CHANGES SHALL BE MADE THAT ARE NECESSARY FOR ADJUSTING, SETTING, AND BALANCING.

   J. PHASE ROTATION AT ALL BUSSES, PANELS, SWITCHGEAR ETC. SHALL BE CHECKED TO SEE THAT IT CONFORMS WITH RECOGNIZED STANDARDS.

   K. BEFORE ENERGIZING ANY FACTORY FABRICATED EQUIPMENT, INSPECT EACH UNIT IN DETAIL, BOLTS AND CONNECTIONS SHALL BE TIGHT (TORQUE TIGHT WHERE REQUIRED) PER MANUFACTURERS SPECIFICATIONS. COMPONENTS SHALL BE ALIGNED AND THE EQUIPMENT SHALL BE PLACED IN A SAFE OPERATIONAL CONDITION.

   L. THE COMPLETE ELECTRICAL SYSTEM SHALL BE FREE OF GROUNDS AND SHORT CIRCUITS. IT SHALL OPERATE PROPERLY UNDER FULL LOAD CONDITIONS WITHOUT EXCESSIVE HEATING AT ANY POINT IN THE SYSTEM.

   M. OBTAIN ALL NECESSARY CONTROL WIRING DIAGRAMS FROM THE EQUIPMENT MANUFACTURER.

   N. PROVIDE ALL NECESSARY CONTROL CIRCUITS AND INTERLOCK WIRING BETWEEN UNITS.

   O. ANY BUILDING SERVICE SHUTDOWNS REQUIRED FOR THIS WORK SHALL BE REQUESTED IN WRITING BY THE ELECTRICAL CONTRACTOR AT LEAST 72 HOURS IN ADVANCE OF THE SHUTDOWN. THE ELECTRICAL CONTRACTOR SHALL OBTAIN APPROVAL IN WRITING FROM THE OWNER PRIOR TO SHUTDOWN. ANY SHUTDOWN AFFECTING THE NORMAL ELECTRICAL SERVICE OF ANY BUILDING OCCUPANTS SHALL BE DONE ON OVERTIME.

   P. INSTALL AND WIRE ALL CONTROL DEVICES AS INDICATED ON THE DRAWING. THE MECHANICAL CONTRACTOR WILL FURNISH ALL CONTROL DEVICES TO THE ELECTRICAL CONTRACTOR AND WILL ASSIST IN THE INSTALLATION OF SAME, UNLESS OTHERWISE NOTED.

4. CONDUITS

   A. ALL CONDUIT SHALL BE CONCEALED IN CONCRETE SLAB, IN WALLS, OR ABOVE FINISHED CEILINGS, UNLESS OTHERWISE NOTED.

   B. WHERE INDICATED, IN SERVICE AREAS, EXPOSED CONDUIT SHALL BE INSTALLED TO PROVIDE THE MAXIMUM HEADROOM BUT IN NO CASE SHALL CONDUIT BE INSTALLED LESS THAN SEVEN (7) FEET ABOVE THE FINISHED FLOOR. CONDUIT INSTALLED IN AREAS WHERE HUNG CEILINGS OR OTHER FURRED SPACES ARE INDICATED SHALL BE INSTALLED CONCEALED.

   C. WHERE WORK IS TO BE CONCEALED, CARE SHALL BE TAKEN TO INSURE THAT IT DOES NOT PROJECT BEYOND THE FINISHED LINES OF FLOORS, CEILINGS, OR WALLS.

   D. EXPOSED CONDUIT AND CONDUIT ABOVE CEILINGS SHALL BE RUN PARALLEL & PERPENDICULAR TO LINES OF THE BUILDING. BENDS SHALL BE FREE FROM DENTS OR FLATTENING. CONDUIT SHALL BE SUPPORTED AND SECURELY FASTENED.

   E. CONDUIT SHALL BE INSTALLED TO MAINTAIN CLEARANCE FROM OTHER PIPING, VALVES, OR OTHER MECHANICAL EQUIPMENT, AND SHALL NOT BE INSTALLED WITHIN 6" OF HOT WATER, STEAM PIPING, HEATING FLUES, OR SIMILAR HOT SURFACES.

   F. CONDUIT SIZES SHALL BE IN ACCORDANCE WITH THE MINIMUM REQUIREMENTS OF THE NEC, EXCEPT NO 1/2" CONDUIT WILL BE PERMITTED (ALL CONDUIT IN WALLS, FLOORS, ABOVE CEILINGS, EXPOSED, OR UNDERGROUND SHALL BE A MINIMUM OF 3/4".)

   G. SLEEVES PASSING THROUGH FIRE WALLS AND ALL SLEEVES PASSING THROUGH FLOORS SHALL BE SIZED TO ALLOW SUFFICIENT SPACE BETWEEN SLEEVE AND CONDUIT FOR FIREPROOFING WITH 3M FIRE BARRIER CAULKING MATERIAL CP25. ALL SPARE SLEEVES PASSING THROUGH FIRE WALLS OR FLOORS SHALL BE THOROUGHLY PACKED WITH 3M FIRE BARRIER PUTTY 303 AND CAPPED.

   H. FLEXIBLE (LIQUID TIGHT) CONDUIT SHALL BE PROVIDED TO CONNECT TO ALL MOTORS, DELICATE INSTRUMENTS AND CONTROLS, AND TO VIBRATING EQUIPMENT.

   I. INSTALLATION SHALL BE SUCH SO AS TO SUPPORT CONDUIT WITHOUT SAGGING AND SHALL BE CLEAR OF THE WORK OF OTHER TRADES. PROVISIONS FOR EXPANSION AND CONTRACTION SHALL BE MADE.

   J. CONDUITS SHALL BE FREE OF MOISTURE AND MANHOLES SHALL BE DRY.

   K. CONDUIT WORK, IN AREAS WHERE NO HUNG CEILINGS ARE PROVIDED, SHALL BE RUN EXPOSED UNLESS SPECIFICALLY NOTED OTHERWISE. IN EXPOSED AND HUNG CEILINGS ALL LIGHTING, RECEPTACLE, AND SWITCH BRANCH CIRCUITS SHALL BE RUN IN EMT. A SIX FOOT WHIP OF 'MC' FLEXIBLE CONDUIT SHALL BE CONNECTED TO LIGHTING FIXTURES. IN STUD WALLS VERTICAL DROPS SHALL BE 'MC' FLEXIBLE CONDUIT. IN FINISHED OR UNFINISHED BLOCK WALLS VERTICAL DROPS SHALL BE EMT CONDUIT RUN IN THE WALL.

5. BOXES

   A. PULL BOXES SHALL BE OF AMPLE SIZE FOR THE APPLICATION, AND SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE NEC REQUIREMENTS.

   B. PULL BOXES SHALL BE INSTALLED BETWEEN A MAXIMUM OF EVERY 3 RIGHT ANGLE BENDS OR THE EQUIVALENT. LONG CONDUITS RUNS SHALL HAVE A PULL BOX AT LEAST EVERY 100'-0".

   C. ALL PULL BOXES SHALL BE INSTALLED IN ACCESSIBLE LOCATIONS.

   D. ALL OUTLET BOXES FOR INTERIOR USE SHALL BE GALVANIZED STAMPED STEEL 4" SQUARE FURNISHED WITH KNOCKOUTS.

6. CABLES/WIRES

   A. USE ONLY APPROVED TYPE LUBRICANT TO FACILITATE THE PULLING OF WIRE AND CABLE.

   B. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE COPPER 75°C. TYPE THWN AND THHN. ALL SIZES SHOWN ON THE DRAWINGS ARE BASED ON THHN COPPER.

   C. WHENEVER MULTIPLE SETS OF FEEDERS ARE RUN TO A DEVICE OR PIECE OF EQUIPMENT, EACH SET SHALL RUN IN ITS OWN CONDUIT. MULTIPLE SETS OF FEEDERS ARE NOT PERMITTED IN A COMMON CONDUIT. NO EXCEPTIONS.

   D. ALUMINUM CONDUCTORS SHALL NOT BE USED.

   E. ALL PHASE LEG, NEUTRAL AND GROUND CONDUCTORS SHALL BE PROPERLY COLOR CODED IN ALL PANELS, TROUGHS, CABINETS, AND BOXES IN ACCORDANCE WITH THE NEC.

   F. ALL CONDUCTORS SHALL BE COPPER.

   G. CONDUCTORS UP TO AND INCLUDING SIZE #6 AWG. SHALL BE TYPE THWN-THHN. CONDUCTORS LARGER THAN SIZE #6 AWG. SHALL BE TYPE THWN, ALL RATED 600 VOLTS, COPPER CONDUCTORS.

   H. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG FOR POWER AND #14 AWG. FOR CONTROL UNLESS OTHERWISE NOTED.

   I. ALL FEEDER WIRING RUN WITHIN THE BUILDING SHALL BE INSTALLED IN ELECTRICAL METALLIC TUBING (EMT).

7. GROUNDING

   A. GROUNDING OF THE NON-CURRENT CARRYING METALLIC PARTS OF ALL ELECTRICAL EQUIPMENT AND ENCLOSURES INCLUDING CONDUITS, SUPPORTS, CABINETS, TRANSFORMERS, MOTOR FRAMES, SWITCHGEAR ENCLOSURES, CONTROL PANELS, ETC., WHICH ARE INSTALLED OR CONNECTED UNDER THIS CONTRACT, SHALL BE PROPERLY CONNECTED TO THE GROUNDING SYSTEM, REGARDLESS OF WHETHER OR NOT THESE CONNECTIONS ARE SHOWN ON THE DRAWINGS.

   B. THE GROUNDING INSTALLATION SHALL HAVE PROVISIONS FOR BOTH SYSTEM AND EQUIPMENT GROUNDS AS DEFINED BY THE NEC. THESE GROUNDING SYSTEMS ARE TO BE EFFECTIVELY INSULATED FROM EACH OTHER EXCEPT AT THE SERVICE CONNECTION.

   C. GROUNDING SHALL BE DONE IN ACCORDANCE WITH THE PROVISIONS OF NEC AND THE NESC. LOCAL REQUIREMENTS OF THE INSPECTION AUTHORITY HAVING JURISDICTION SHALL GOVERN IN ALL MATTERS OF INTERPRETATION.

8. SAFETY SWITCHES

   A. FURNISH AND INSTALL ALL DISCONNECT SWITCHES INDICATED ON THE DRAWINGS, UNLESS OTHERWISE NOTED

   B. ALL SAFETY SWITCHES SHALL BE QUICK MAKE, QUICK BREAK TYPE.

   C. ALL SAFETY SWITCHES, STARTERS, PUSH BUTTONS, AND ENCLOSURES SHALL BE UL LISTED AND SHALL BE NEMA 1 FOR INDOOR AND NEMA 3R FOR OUTDOOR, UNLESS OTHERWISE NOTED.

   D. ALL SAFETY SWITCHES SHALL BE HORSEPOWER RATED AND HAVE PROVISIONS FOR LOCKOUT.

   E. ALL SAFETY SWITCHES SHALL BE AS MANUFACTURED BY SQUARE 'D', CUTLER-HAMMER OR APPROVED EQUAL.

9. EXISTING UTILITIES

   A. THE LOCATION OF ALL EXISTING UTILITIES SHOWN ON THIS SET OF PLANS HAS BEEN DETERMINED FROM FIELD MEASUREMENTS AND / OR PLANS PROVIDED TO FRENCH & PARRELLO ASSOCIATES. NO GUARANTEE IS MADE NOR SHOULD BE ASSUMED AS TO THE COMPLETENESS OR ACCURACY OF THE HORIZONTAL OR VERTICAL LOCATIONS. ALL PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN PRIOR TO CONSTRUCTION ACTIVITIES.

NATURAL GAS PIPING SPECIFICATIONS

PART 1 - GENERAL

1.1 SYSTEM PERFORMANCE REQUIREMENTS

   A. MINIMUM WORKING-PRESSURE RATINGS: EXCEPT WHERE OTHERWISE INDICATED, MINIMUM PRESSURE REQUIREMENTS ARE AS FOLLOWS:

      1. LOW-PRESSURE NATURAL GAS PIPING: 7-8" WC.
      2. MEDIUM-PRESSURE NATURAL GAS PIPING: 2 PSI.

1.2 SUBMITTALS

   A. COORDINATION DRAWINGS FOR NATURAL GAS PIPING, INCLUDING REQUIRED CLEARANCES AND RELATIONSHIP TO OTHER SERVICES FOR SAME WORK AREAS.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

   A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

      1. GAS STOPS, 2-INCH NPS (DN50) AND SMALLER:

         A. HAMMOND VALVE CORP.
         B. JOMAR INTERNATIONAL, LTD.
         C. MAXITROL CO.
         D. MCDONALD: A.Y. MCDONALD MFG. CO.
         E. MILWAUKEE VALVE CO., INC.
         F. MUELLER CO.
         G. NATIONAL METER.

      2. GAS VALVES, 2-INCH NPS (DN50) AND SMALLER:

         A. CONBRACO INDUSTRIES, INC.; APOLLO DIV.
         B. CORE INDUSTRIES, INC.; MUELLER STEAM SPECIALTY DIV.
         C. HUBER: J.M. HUBER CORP.; FLOW CONTROL DIV.
         D. MCDONALD: A.Y. MCDONALD MFG. CO.
         E. MILLIKEN VALVE CO., INC.
         F. MILWAUKEE VALVE CO., INC.
         G. MUELLER CO.
         H. NATIONAL METER.
         I. NORDSTROM VALVES, INC.
         J. OLSON TECHNOLOGIES, INC.

      3. GAS VALVES, 2-1/2-INCH NPS (DN65) AND LARGER:

         A. CORE INDUSTRIES, INC.; MUELLER STEAM SPECIALTY DIV.
         B. HUBER: J.M. HUBER CORP.; FLOW CONTROL DIV.
         C. MILLIKEN VALVE CO., INC.
         D. NORDSTROM VALVES, INC.
         E. OLSON TECHNOLOGIES, INC.
         F. XOMOX CORP.

2.2 PIPES AND TUBES

   A. ALL EXPOSED PIPING AND FITTINGS SHALL BE GALVANIZED AND PAINTED TO MATCH.

   B. STEEL PIPE: ASTM A 53; TYPE E, ELECTRIC-RESISTANCE WELDED OR TYPE S, SEAMLESS; GRADE B; SCHEDULE 40; BLACK.

   C. PE PIPE: ASTM D 2513.

2.3 PIPE AND TUBE FITTINGS

   A. MALLEABLE-IRON THREADED FITTINGS: ASME B16.3, CLASS 150, STANDARD PATTERN, WITH THREADED ENDS CONFORMING TO ASME B1.20.1.

   B. UNIONS: ASME B16.39, CLASS 150, MALLEABLE IRON WITH BRASS-TO-IRON SEAT, GROUND JOINT, AND THREADED ENDS CONFORMING TO ASME B1.20.1.

   C. STEEL FITTINGS: ASME B16.9, WROUGHT STEEL, BUTT-WELDING TYPE; AND ASME B16.11, FORGED STEEL.

   D. BRONZE FLANGES AND FLANGED FITTINGS: ASME B16.24, CLASS 150.

   E. CAST-IRON FLANGES AND FLANGED FITTINGS: ASME B16.1, CLASSES 125 AND 250.

2.4 JOINING MATERIALS

   A. BRAZING FILLER METALS: AWS A5.8, SILVER CLASSIFICATION BAG-1. FILLER METAL CONTAINING PHOSPHORUS IS PROHIBITED.

   B. JOINT COMPOUND AND TAPE: SUITABLE FOR NATURAL GAS.

   C. GASKET MATERIAL: THICKNESS, MATERIAL, AND TYPE SUITABLE FOR NATURAL GAS.

2.5 VALVES

   A. MANUAL VALVES: CONFORM TO STANDARDS LISTED OR, WHERE APPROPRIATE, TO ANSI Z221.15.

   B. GAS STOPS, 2-INCH NPS (DN50) AND SMALLER: AGA-CERTIFIED, BRONZE-BODY, PLUG TYPE WITH BRONZE PLUG, BALL TYPE WITH CHROME-PLATED BRASS BALL, OR BUTTERFLY VALVE WITH STAINLESS-STEEL DISC AND FLUOROCARBON ELASTOMER SEAL, FOR 2 PSIG (13.8 KPA) OR LESS NATURAL GAS. INCLUDE AGA STAMP, FLAT OR SQUARE HEAD OR LEVER HANDLE, AND THREADED ENDS CONFORMING TO ASME B1.20.1.

      1. LOCKING DEVICE: INCLUDE LOCKING (TAMPERPROOF) FEATURE.

   C. GAS VALVES, 2-INCH NPS (DN50) AND SMALLER: ASME B16.33, 150 PSIG (1035 KPA) WOG, BRONZE BODY, BRONZE PLUG, STRAIGHTAWAY PATTERN, SQUARE HEAD, TAPERED-PLUG TYPE, WITH THREADED ENDS CONFORMING TO ASME B1.20.1.

      1. LOCKING DEVICE: INCLUDE LOCKING (TAMPERPROOF) FEATURE.

   D. GAS VALVES, 2-1/2-INCH NPS (DN65) AND LARGER: MSS SP-78, CLASS 125 OR CLASS 175 WOG, NONLUBRICATED-PLUG TYPE WITH POLYTETRAFLUOROETHYLENE (PTFE) LINING OR SLEEVE, SEMISTEEL BODY, WRENCH OPERATED, WITH FLANGED ENDS.

      1. LOCKING DEVICE: INCLUDE LOCKING (TAMPERPROOF) FEATURE.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

   A. GENERAL: FLANGES, UNIONS, TRANSITION AND SPECIAL FITTINGS, AND VALVES WITH PRESSURE RATINGS SAME AS OR HIGHER THAN SYSTEM PRESSURE RATING MAY BE USED IN APPLICATIONS BELOW, EXCEPT WHERE OTHERWISE INDICATED.

      1. COMPLY WITH INTERNATIONAL FUEL GAS CODE FOR INSTALLATION AND PURGING OF NATURAL GAS PIPING.

   B. LOW-PRESSURE, 0.5 PSIG (3.45 KPA) OR LESS, NATURAL GAS SYSTEMS: USE THE FOLLOWING:

      1. 1-INCH NPS (DN25) AND SMALLER: STEEL PIPE, MALLEABLE-IRON THREADED FITTINGS, AND THREADED JOINTS.
      2. 1-1/4- TO 2-INCH NPS (DN32 TO DN50): STEEL PIPE, MALLEABLE-IRON THREADED FITTINGS, AND THREADED JOINTS.
      3. 1-1/4- TO 2-INCH NPS (DN32 TO DN50): STEEL PIPE, BUTT-WELDING FITTINGS, AND WELDED JOINTS.
      4. 2-1/2- TO 4-INCH NPS (DN65 TO DN100): STEEL PIPE, MALLEABLE-IRON THREADED FITTINGS, AND THREADED JOINTS.

   C. MEDIUM-PRESSURE, 0.5 TO 2 PSIG (3.45 TO 13.8 KPA), NATURAL GAS SYSTEMS: USE THE FOLLOWING:

      1. 1-INCH NPS (DN25) AND SMALLER: STEEL PIPE, BUTT-WELDING FITTINGS, AND WELDED JOINTS.
      2. 1-1/4-INCH NPS (DN32) AND LARGER: STEEL PIPE, BUTT-WELDING FITTINGS, AND WELDED JOINTS.

   D. HIGH-PRESSURE, ABOVE 2 TO 5 PSIG (13.8 TO 34.5 KPA), NATURAL GAS SYSTEMS: STEEL PIPE, BUTT-WELDING FITTINGS, AND WELDED JOINTS.

   E. UNDERGROUND, NATURAL GAS SYSTEMS: USE PE PIPE COMPLYING WITH ASTM D 2513, SDR 11 INLET CONNECTED TO STEEL PIPE COMPLYING WITH ASTM A 53/A 53M, SCHEDULE 40, TYPE E OR S, GRADE B, WITH CORROSION-PROTECTIVE COATING FOR ABOVE GROUND OUTLET.

      1. A YELLOW INSULATED COPPER TRACER WIRE SHALL BE INSTALLED ADJACENT TO UNDERGROUND NONMETALLIC PIPING. WIRE SHALL TERMINATE ABOVE GROUND AT EACH END OF THE NON METALLIC PIPING. THE TRACER WIRE SIZE SHALL NOT BE LESS THAN 18AWG AND THE INSULATION TYPE SHALL BE SUITABLE FOR DIRECT BURIAL.

3.2 VALVE APPLICATIONS

   A. USE GAS VALVES OF SIZES INDICATED FOR GAS SERVICE PIPING, METERS, MAINS, AND WHERE INDICATED.

3.3 PIPING INSTALLATIONS

   A. INSTALL GAS PIPING AT UNIFORM GRADE OF 0.1 PERCENT SLOPE UPWARD TOWARD RISERS.

   B. USE ECCENTRIC REDUCER FITTINGS TO MAKE REDUCTIONS IN PIPE SIZES. INSTALL FITTINGS WITH LEVEL SIDE DOWN.

   C. CONNECT BRANCH PIPING FROM TOP OR SIDE OF HORIZONTAL PIPING.

   D. INSTALL UNIONS IN PIPES 2-INCH NPS (DN50) AND SMALLER, ADJACENT TO EACH VALVE, AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT, AND ELSEWHERE AS INDICATED. UNIONS ARE NOT REQUIRED ON FLANGED DEVICES.

   E. INSTALL DIELECTRIC FITTINGS (UNIONS AND FLANGES) WITH FERROUS AND BRASS OR BRONZE END CONNECTIONS, SEPARATED BY INSULATING MATERIAL, WHERE PIPING OF DISSIMILAR METALS IS JOINED.

   F. INSTALL DIELECTRIC FITTINGS (UNIONS AND FLANGES) WITH 2 FERROUS END CONNECTIONS, SEPARATED BY INSULATING MATERIAL, AT OUTLET FROM GAS METER AND, WHERE INDICATED, FOR FERROUS PIPING.

   G. INSTALL FLANGES ON VALVES, SPECIALTIES, AND EQUIPMENT HAVING 2-1/2-INCH NPS (DN65) AND LARGER CONNECTIONS.

   H. PAINT ALL ABOVE GROUND PIPING TO MATCH EXISTING GAS PIPING WITH A MINIMUM OF (2) COATS OF EXTERIOR LATEX PAINT. COLOR TO MATCH EXISTING EXPOSED STADIUM PIPING COLOR SUBMITTED TO MLS FOR REVIEW AND APPROVAL. PROTECT ALL SURFACES FROM PAINT OVERSPRAY/DRIPS.

3.4 JOINT CONSTRUCTION

   A. USE MATERIALS SUITABLE FOR NATURAL GAS SERVICE.

      1. BRAZED JOINTS: MAKE JOINTS WITH BRAZING ALLOY HAVING MELTING POINT GREATER THAN 1000 DEG F (540 DEG C). BRAZING ALLOYS CONTAINING PHOSPHORUS ARE PROHIBITED.

3.5 VALVE INSTALLATION

   A. INSTALL VALVES IN ACCESSIBLE LOCATIONS, PROTECTED FROM DAMAGE. TAG VALVES WITH METAL TAG INDICATING PIPING SUPPLIED. ATTACH TAG TO VALVE WITH METAL CHAIN.

   B. INSTALL GAS VALVE UPSTREAM FROM EACH GAS PRESSURE REGULATOR. WHERE 2 GAS PRESSURE REGULATORS ARE INSTALLED IN SERIES, VALVE IS NOT REQUIRED AT SECOND REGULATOR.

   C. INSTALL PRESSURE RELIEF OR PRESSURE-LIMITING DEVICES SO THEY CAN BE READILY OPERATED TO DETERMINE IF VALVE IS FREE; TEST TO DETERMINE PRESSURE AT WHICH THEY WILL OPERATE; AND EXAMINE FOR LEAKAGE WHEN IN CLOSED POSITION.

3.6 CONNECTIONS

   A. INSTALL GAS PIPING NEXT TO EQUIPMENT AND APPLIANCES USING GAS TO ALLOW SERVICE AND MAINTENANCE.

   B. CONNECT GAS PIPING TO EQUIPMENT USING GAS WITH SHUTOFF VALVES AND UNIONS.

3.8 LABELS

   A. PROVIDE PREPRINTED "NATURAL GAS" LABELS EVERY 5 FEET ON ALL EXPOSED PIPING.

   B. LABELS SHALL HAVE A YELLOW FIELD WITH BLACK LETTERS.

3.9 FIELD QUALITY CONTROL

   A. INSPECT, TEST, AND PURGE PIPING ACCORDING TO NFPA 54, PART 4 "GAS PIPING INSPECTION, TESTING, AND PURGING" AND REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

   B. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST SYSTEM UNTIL SATISFACTORY RESULTS ARE OBTAINED.

   C. REPORT TEST RESULTS PROMPTLY AND IN WRITING TO ARCHITECT AND AUTHORITIES HAVING JURISDICTION.

   D. VERIFY CAPACITIES AND PRESSURE RATINGS OF GAS METERS, REGULATORS, VALVES, AND SPECIALTIES.

   E. VERIFY CORRECT PRESSURE SETTINGS FOR PRESSURE REGULATORS.

   F. VERIFY THAT SPECIFIED PIPING TESTS ARE COMPLETE.

4.0 ADJUSTING

   A. ADJUST CONTROLS AND SAFETY DEVICES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND SAFETY DEVICES.

No.	Date	Revision	Revised By	Checked By

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SPECIFICATIONS

HOUSING AUTHORITY CITY OF PERTH AMBOY

STANDYBY GENERATOR INSTALLATION

881 AMBOY AVENUE
PERTH AMBOY, NJ 08862

PERTH AMBOY
MONMOUTH COUNTY NEW JERSEY

DATE:	DESIGNED BY:	SCALE:	PROJECT NUMBER:
06/03/2015	AMP	AS NOTED	6805.001
DRAWN BY:	CHECKED BY:	FIELD BOOK	SHEET:
AMP	AHG		E-300

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GENERATOR SPECIFICATIONS

FURNISH ALL EQUIPMENT, MATERIALS, AND LABOR TO INSURE A COMPLETE, FUNCTIONAL, AND RELIABLE STANDBY NATURAL GAS-FIRED POWER UNIT AS SPECIFIED HEREIN. ONLY MANUFACTURER'S AUTHORIZED DEALERS WHO HAVE A MINIMUM OF FIFTEEN YEARS EXPERIENCE IN THE FIELD OF POWER GENERATION WITH THE SAME MANUFACTURER WHOSE PRODUCTS ARE BEING OFFERED AND CAN CERTIFY TO THIS REQUIREMENT, ARE ALLOWED TO SUPPLY EQUIPMENT FOR THIS PROJECT. THE DEALER MUST BE AUTHORIZED BY THE MANUFACTURER TO ADMINISTRATE WARRANTY FOR THE ENGINE GENERATOR SET AND MUST EMPLOY FACTORY TRAINED MECHANICS.

THE ENGINE GENERATOR SET SHALL BE FACTORY FABRICATED AND ASSEMBLED PACKAGE OF NEW AND QUALITY GRADE COMPONENTS. ONLY THOSE PRODUCTS CURRENTLY BEING MANUFACTURED FOR THE PURPOSE OF POWER GENERATION WILL BE CONSIDERED. ALL WORK SHALL BE OF THE HIGHEST QUALITY PERFORMED BY EXPERIENCED PERSONNEL IN THE FIELD OF POWER GENERATION.

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EQUIPMENT FURNISHED UNDER THIS SECTION SHALL BE GUARANTEED BY THE MANUFACTURER AND ADMINISTERED BY THE SELLING DEALER AGAINST DEFECTS IN MATERIALS OR WORKMANSHIP FOR A PERIOD OF FIVE YEARS FROM DATE OF INITIAL USE. IT SHALL COVER FULL PARTS AND LABOR. ACCEPTABLE MANUFACTURERS OF STANDBY NATURAL GAS-FIRED GENERATORS ARE AS FOLLOWS:

A. KOHLER (BASIS OF DESIGN PRODUCT)
B. CUMMINS/ONAN
C. CATERPILLAR

SUBMITTALS AND DRAWING REQUIREMENTS

COMPLIANCE: AT THE TIME OF BID, SUPPLIER MUST SUBMIT COMPLIANCE WITH THE SPECIFICATIONS, A COPY OF THE MANUFACTURER'S PRINTED AND PUBLISHED SERVICE MANUAL, PARTS BOOK, INSTALLATION GUIDE, OPERATION GUIDE, SERVICE DIRECTORY, AND WARRANTY SHALL BE AVAILABLE TO THE ENGINEER DURING BID EVALUATION.

SUBMITTAL DATA: THE SUCCESSFUL BIDDER SHALL SUBMIT, WITHIN ONE (1) WEEK OF ISSUANCE OF PURCHASE ORDER, SIX SETS OF BOUND SUBMITTALS INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:

1. STANDARD MANUFACTURER'S PRINTED SPECIFICATION SHEET SHOWING CRITICAL ENGINE AND GENERATOR SET SPECIFICATIONS INCLUDING DIMENSIONS, WEIGHTS, AND GUARANTEED FUEL CONSUMPTION AT 25%, 50%, 75%, AND 100% OF FULL RATED LOAD, ENGINE BHP AVAILABLE, JACKET WATER HEAT REJECTION, COOLING PUMP CHARACTERISTICS, EXHAUST FLOW RATE AND TEMPERATURE AT RATED LOAD, VENTILATION REQUIREMENTS, COMBUSTION AIR REQUIREMENTS, MAXIMUM ALLOWABLE AIR FLOW AND AMBIENT TEMPERATURE RESTRICTIONS, EXHAUST BACK PRESSURE LIMITATION, ROLLING AMPERE RATE FOR ELECTRIC STARTING, LIQUID REFILL CAPACITIES, GENERATOR EFFICIENCY AT 50%, 75%, AND 100% LOAD, GENERATOR SET VENTILATION REQUIREMENTS, TIF, HARMONIC WAVE DISTORTION, DIRECT AXIS TRANSIENT REACTANCE (X"D), DIRECT AXIS SUBTRANSIENT REACTANCE (X"D), TYPE OF WINDING INSULATION, GENERATOR TEMPERATURE RISE, REGULATION CHARACTERISTICS, GENERATOR TYPE OF CONSTRUCTION AND OVERSPEED CAPABILITIES, AND SHORT CIRCUIT CURRENT CAPABILITY CURVES.
2. STANDARD MANUFACTURER'S PRINTED WARRANTY STATEMENT OF THE ENGINE AND GENERATOR SET SHOWING SINGLE SOURCE OF RESPONSIBILITY BY THE ENGINE MANUFACTURER.
3. GENERATOR CONTROL PANEL EQUIPMENT AND FEATURES.
4. ACCESSORY CATALOG CUTS INCLUDING THE FLEXIBLE EXHAUST COUPLING, MUFFLER, BATTERIES MAINLINE CIRCUIT BREAKER AND ENCLOSURE, ENGINE MANUFACTURER'S SHUTDOWN, CONTACTORS, FUEL LINES, JACKET WATER HEATER, FUEL DAY TANK, AND VOLTAGE REGULATOR. INCLUDE A DETAILED STATEMENT CONCERNING NON- ENGINE GENERATOR SET MANUFACTURER'S RESPONSIBILITY AND DURATION OF POLICY.
5. SPARE PARTS LIST.
6. MANUFACTURER'S PART NUMBER FOR THE ENGINE AND GENERATOR OPERATION GUIDE, PARTS BOOK, SERVICE MANUAL, WARRANTY POLICY, AND INSTALLATION GUIDE.
7. DRAWING AND WIRING SCHEMATICS OF PROPOSED ASSEMBLY, BATTERY RACK, MUFFLER AND FLEXIBLE FITTINGS.
8. GENERATOR ENCLOSURE DIMENSIONAL DETAILS, NOISE RATINGS ETC.
9. NOT USED.

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GENERATOR SET CHARACTERISTICS AT 1800 RPM, 120/208 VOLT 3 PHASE

1. STANDBY KW: 80 KW
2. POWER FACTOR: 0.80
3. FREQUENCY: 60 HZ .

THE SPECIFIED STANDBY KW SHALL BE FOR CONTINUOUS ELECTRICAL SERVICE, INTERRUPTION OF THE NORMAL UTILITY SOURCE, PER NEMA STANDARDS. THE ENGINE SHALL BE WATER COOLED, OF FOUR STROKE CYCLE DESIGN, COMPRESSION IGNITED, RATED FOR CONTINUOUS STANDBY APPLICATION. IT SHALL PRODUCE SUFFICIENT HORSEPOWER TO ACHIEVE RATINGS AS SHOWN ON THE DRAWING WHILE DRIVING ALL ACCESSORIES AND PARASITIC LOADS SUCH AS FUEL, LUBE OIL, AND JACKET WATER PUMPS. THE ENGINE CYLINDERS SHALL BE EQUIPPED WITH REPLACEABLE CYLINDER LINERS AND SHALL BE FULLY WATER COOLED. PISTONS SHALL BE ONE PIECE, THREE RING DESIGN. CONNECTING RODS SHALL BE FORGED, HARDENED, AND PEENED FOR INCREASED STRENGTH. MAIN AND ROD BEARINGS SHALL BE OF ALUMINUM CONSTRUCTION WITH COPPER BONDING TO THE LEAD TIN OVERLAY, SUPER FINISHED FOR UNIFORM FILM. THE ENGINE SHALL INCORPORATE ONE PIECE HIGH STRENGTH CYLINDER HEADS. THE LUBE OIL FILTER SYSTEM SHALL BE OF THE FULL FLOW TYPE WITH A BUILT IN BYPASS. THE CYLINDER BLOCK SHALL BE OF SINGLE PIECE CONSTRUCTION AND CONSTRUCTED IN SUCH A WAY THAT LINER SHALL REST ON THE TOP OF THE BLOCK WITH A SPACER PLATE INSTALLED BETWEEN THE BLOCK AND CYLINDER HEAD. EACH CYLINDER SHALL HAVE A CONTINUOUSLY PRESSURIZED OIL COOLING JET DIRECTED AT BOTTOM OF THE PISTONS.

THE ENGINE SHALL BE EQUIPPED WITH A SPEED CONTROL WITH 0 (ISOCHRONOUS) SPEED DROOP FROM NO LOAD TO FULL RATED LOAD AND STEADY STATE SPEED REGULATION SHALL BE .0.25% OVER A RANGE OF -40°C TO 75°C. THE ENGINE SHALL BE EQUIPPED WITH AN ACTUATOR MOUNTED ON THE ENGINE, WOODWARD 2301 ELECTRONIC SPEED CONTROL, OR EQUAL.

THE GENERATOR SET SHALL HAVE INSTALLED AND BE WARRANTEED BY THE ENGINE MANUFACTURER WITH THE FOLLOWING ALARMS AND SHUTDOWNS.

A. OIL PRESSURE SHUTDOWN WITH STEP PROTECTION AT HIGH AND LOW IDLE
B. OVERSPEED SHUTDOWN
C. OVERCRANK SHUTDOWN
D. EMERGENCY STOP PUSHBUTTON

PROVIDE TWO JACKET WATER HEATERS OF SUFFICIENT CAPACITY TO MAINTAIN JACKET WATER AT 90°F IN AMBIENT TEMPERATURE OF 20°F FOR QUICK EMERGENCY START. THEY SHALL BE TANK TYPE TO ENSURE PROPER THERMAL CIRCULATION, IMMERSION HEATERS ARE NOT ACCEPTABLE. THE HEATERS SHALL BE AS SPECIFIED BY MANUFACTURER EACH AT 120 VOLTS, SINGLE PHASE SUPPLIED FROM THE NORMAL POWER SOURCE. EACH HEATER SHALL BE THERMOSTATICALLY CONTROLLED WITH ITS OWN THERMOSTAT.

PROVIDE A CRITICAL GRADE EXHAUST SILENCER (MAXIM M41) OR APPROVED EQUAL, PROPERLY SIZED AND INSTALLED BY THE MANUFACTURER. THE EXHAUST OUTLETS ON THE ENGINE SHALL BE JOINED SO THERE IS ONLY ONE COMMON EXHAUST CONNECTION, ONE COMMON FLEXIBLE CONNECTION AND ONE COMPANION FLANGE. GASKETS SHALL BE FURNISHED AS REQUIRED

PROVIDE A STAINLESS STEEL BELLOWS TYPE FLEXIBLE EXHAUST CONNECTION. A 90° ELBOW WITH RAINCAP WILL ALSO BE INSTALLED ON THE MUFFLER OUTLET. EXHAUST WILL TRAVEL THROUGH THE ENCLOSURE AND EXHAUST AT THE ROOF LEVEL. GENERATOR MAIN OUTPUT CIRCUIT BREAKER SHALL BE UL LISTED MOLDED CASE THERMAL-MAGNETIC TYPE AND SHALL BE MOUNTED ON THE GENERATOR. IT SHALL BE SIZED AT 200A, WITH 3 POLE, 208 VOLTS WITH A 24 VOLT DC SHUNT TRIP.

THE VOLTAGE REGULATOR SHALL BE SOLID STATE, THREE SENSING, VOLTS PER HERTZ TYPE AND MANUFACTURED BY THE ENGINE GENERATOR SET MANUFACTURER. IT SHALL BE SHOCK MOUNTED IN THE GENERATOR PROVIDING ±1% NO LOAD TO FULL LOAD REGULATION. VOLTAGE DRIFT SHALL BE NO MORE THAN ±0.5% OF RATED VALUE AT CONSTANT TEMPERATURE. ADJUSTABLE CONTROLS FOR VOLTAGE DROOP, LEVEL AND GAIN SHALL BE EASILY ACCESSIBLE. VOLTAGE LEVEL ADJUSTMENT SHALL BE A MINIMUM ±10%. CURRENT LIMITING CIRCUITS SHALL BE USED TO RESTRAIN EXCITER FIELD CURRENT IN THE EVENT OF A SUSTAINED LOW POWER FACTOR LOAD. IT SHALL PROVIDE RAPID RESPONSE DURING TRANSIENT CONDITIONS. OVERVOLTAGE AND UNDERVOLTAGE PROTECTION SHALL BE PROVIDED ALONG WITH A SOLID STATE CIRCUIT TO REMOVE EXCITATION WHEN GENERATOR OVERLOAD FOR MORE THAN 10 SECONDS OCCURS. TELEPHONE INFLUENCE FACTOR SHALL NOT EXCEED 50. AT FULL THROTTLE ENGINE STARTING, OUTPUT VOLTAGE SHALL NOT OVERSHOOT MORE THAN 5% OF ITS RATED VALUE, WITH RESPECT TO THE VOLTS/HZ CURVE AND RESPONSE TIME SHALL BE LESS THAN 20 MILLISECONDS.

A GENERATOR MOUNTED NFPA-110 SOLID STATE PRE-WIRED CONTROL PANEL WITH DIGITAL READOUT METERS AND SELF DIAGNOSTIC CAPABILITY SHALL BE PROVIDED, SHOCK MOUNTED AND VIBRATION ISOLATED ON THE GENERATOR. CONTROL PANEL SHALL INCLUDE 1% TRUE RMS READING METERS FOR AMPS AND VOLTS, A PHASE SELECTOR SWITCH (FOUR POSITION), FREQUENCY METER, VOLTAGE ADJUST RHEOSTAT, OIL PRESSURE GAUGE, WATER TEMPERATURE GAUGE, BATTERY DC VOLTMETER, TACHOMETER, AUTO START-STOP CONTROL MODULE, OVERCRANK, 4-POSITION ENGINE CONTROL SWITCH FOR: STOP-OFF/RESET-MANUAL-AUTO, CYCLE CRANKING, COOLDOWN TIMER, AND EMERGENCY STOP PUSHBUTTON.

PROVIDE AN ALARM MODULE WITH FLASHING LEDS AND HORN TO ANNUNCIATE THE FOLLOWING:

A. HIGH COOLANT TEMPERATURE ALARM
B. LOW COOLANT TEMPERATURE ALARM
C. LOW OIL PRESSURE ALARM
D. LOW DC VOLTS ALARM
E. SYSTEM NOT IN AUTOMATIC
F. LOW FUEL LEVEL
G. FUEL TANK LEAK
H. ENGINE RUN CONTACT
I. AUXILIARY RELAY
J. ALL NECESSARY CONTROL WIRING, FUSES, FUSE BLOCKS, TERMINAL BLOCKS, NAMEPLATES, FAULT CONTACTS, AUXILIARY CONTACTS, METERING CONTROL TRANSFORMERS.
K. PROVIDE A REMOTE ANNUNCIATOR PANEL WITH ALARM INDICATING LIGHTS AND ALARM HORN WITH TEST SWITCH AND SILENCE BUTTON FOR THE FOLLOWING ALARM CONDITIONS:

A. LOW OIL PRESSURE
B. HIGH WATER TEMPERATURE
C. OVERSPEED
D. BATTERY CHARGER MALFUNCTION
E. OVERCRANK
F. GENERATOR RUNNING
G. SYSTEM NOT IN AUTO

THE ENGINE AND GENERATOR SHALL BE FACTORY MOUNTED ON A TORSIONALLY STIFF BASE, FABRICATED FROM CHANNEL OR I-BEAM TO INSURE ADEQUATE MOUNTING SURFACE CONTACT AND MINIMAL DEFLECTION.

ALTERNATOR: THE POWER GENERATOR SHALL BE OF THE SINGLE BEARING TYPE, 1800 RPM, 80 KW, 0.80 PF, 60 HZ, 3 PHASE, 4 WIRE, 120/208V, PMG TYPE. SUBTRANSIENT REACTANCE SHALL BE A MINIMUM OF 0.11 PER UNIT ON THE DIRECT ACCESS. THE POWER GENERATOR SHALL BE MANUFACTURED AND PACKAGED BY THE ENGINE MANUFACTURER TO INSURE PROPER PERFORMANCE AND EFFECT A SINGLE SOURCE OF RESPONSIBILITY. THE GENERATOR SHALL BE RATED AND CONFORM TO NEMA STANDARDS FOR TEMPERATURE RISE AND CONSTRUCTION. THE UNIT SHALL BE SYNCHRONOUS, TROPICALIZED AND BUILT PER NEMA MG I-22 AND IEEE STANDARDS. CLASS H INSULATION SHALL BE USED ON STATOR AND ROTOR AND BOTH SHALL BE PROTECTED WITH AN ASPHALT MODIFIED EPOXY ON ALL END COILS. TEMPERATURE RISE SHALL BE 125°C. THE ROTOR ASSEMBLY SHALL DEMONSTRATE 130% OVERSPEED CAPABILITY AT 170°C FOR 2 HOURS. THE GENERATOR ROTOR TWO PLANE DYNAMIC BALANCE SHALL BE WITHIN 0.002" PEAK-TO-PEAK AMPLITUDE DISPLACEMENT WHILE AT OPERATING SPEED. THE GENERATOR SHALL HAVE A WAVEFORM DEVIATION OF NOT MORE THAN 5% AND SHALL MEET NEMA LIMITS FOR TELEPHONE INFLUENCE FACTORS. GENERATOR PITCH SHALL BE 2/3. POWER SUPPLY TO THE VOLTAGE REGULATOR AND ROTOR FIELD SHALL BE BY A SEPARATE PERMANENT MAGNET GENERATOR (PMG).

A 24 VOLT DC ELECTRIC STARTING SYSTEM WITH POSITIVE ENGAGEMENT DRIVE SHALL BE FURNISHED, INCLUDING THE FOLLOWING:

A. 24 VOLT LEAD-ACID STORAGE BATTERIES OF THE HEAVY DUTY NATURAL GAS STARTING TYPE. THE BATTERY SET SHALL BE COMPLETE WITH STEEL RACK, NECESSARY CABLE AND CONNECTORS, ALL IN CONFORMANCE WITH THE ENGINE MANUFACTURER'S REQUIREMENTS. ONE SET OF BATTERIES SHALL BE PROVIDED PER INDIVIDUAL GENERATOR SET. BATTERY SET SHALL HAVE SUFFICIENT AMP HOUR CAPACITY FOR ENGINE STARTING ETC. WITH AMPLE RESERVE PER MANUFACTURER'S RECOMMENDATIONS.

B. A 10 AMP MINIMUM, AUTOMATIC DUAL RATE BATTERY CHARGER, AS MANUFACTURED BY LAMARCHE OR APPROVED EQUAL, SHALL BE PROVIDED. THE CHARGER SHALL RECYCLE AUTOMATICALLY TO "ON" OR HIGH RATE AT SUFFICIENT FREQUENCY TO MAINTAIN HIGH STATE OF CHARGE AND LONG BATTERY LIFE. THE CHARGER SHALL BE COMPLETE WITH DC AMMETER, VOLTMETER, ON-OFF SWITCH, DC FUSE, LOW VOLTAGE ALARM CONTACTS AND CHARGING INDICATOR LIGHT. THE 120 VOLT INPUT TO THE CHARGER SHALL BE AUTOMATICALLY DISCONNECTED DURING ENGINE CR

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PROVIDE AUTOMATIC TRANSFER SWITCH OF 200 AMPS CAPACITY, 3 POLE, 600 VOLT, FULLY RATED AND MOUNTED IN A NEMA 3R ENCLOSURE. IT SHALL INCORPORATE MICROPROCESSOR LOGIC AND CONFORM TO NEMA IC510-1993, NFPA 70, NFPA 99, NFPA 110, AND UL 1008 AND IEEE STANDARD 446. THE SWITCH SHALL BE RATED FOR 208Y/120V SERVICE AND MANUFACTURED BY ASCO, RUSSELL, ZENITH, OR AS APPROVED BY THE ENGINEER AND INCLUDE THE FOLLOWING FEATURES:

CRANKING CYCLE

A. THE AUTOMATIC TRANSFER SWITCH SHALL BE THE PRODUCT OF ONE MANUFACTURER AND BE COMPLETELY FACTORY INTERCONNECTED AND

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TESTED SO THAT ONLY THE SERVICE AND LOAD CONNECTIONS TO THE SWITCH ARE REQUIRED FOR FIELD INSTALLATION.

B. OPERATING TRANSFER SWITCH CONSISTING OF SINGLE SOLENOID, ELECTRICALLY OPERATED, MECHANICALLY HELD.
C. SOLDERLESS CONNECTORS FOR NORMAL SOURCE CABLES, EMERGENCY SOURCE CABLES, LOAD CABLES, AND SOLID NEUTRAL BAR.
D. HIGH FAULT WITHSTANDING CAPACITY.
E. VOLTAGE MONITORING OF EACH PHASE OF NORMAL SOURCE (FULL PROTECTION), ADJUSTABLE 70% - 90%.
F. VOLTAGE OF EMERGENCY TRANSFER, 80% RATED.
G. FREQUENCY OF EMERGENCY TRANSFER, 80% OF RATED.
H. VOLTAGE AND FREQUENCY MONITORING OF ONE PHASE OF EMERGENCY SOURCE.
I. TIME DELAY, ENGINE STARTING, ADJUSTABLE 0 TO 10 SECONDS.
J. ENGINE MINIMUM RUN (10 MINUTES, ADJUSTABLE).
K. RETURN TO UTILITY DELAY (30 SECONDS, ADJUSTABLE).
L. ENGINE COOL DOWN TIMER (10 MINUTES, ADJUSTABLE).
M. ENGINE WARM-UP (30 SECONDS ADJUSTABLE), OVERRIDE SWITCH FOR NO DELAY.
N. TIME DELAY NEUTRAL (0 OR 5 SECONDS SWITCH SELECTABLE).
O. THREE POSITION MODE SELECTOR SWITCH ON THE FACE OF THE ENCLOSURE, MARKED AUTO, TEST, AND FAST TEST.
P. FAST TEST MODE: RESETS ENGINE MINIMUM RUN (TO 10 SECONDS), ENGINE COOL DOWN (TO 0 SECONDS), AND RETURN TO UTILITY (0 TO 5 SECONDS).
Q. SELF-CHECK BUILT-IN - AT START-UP, ROUTINE CHECK OF ATS CIRCUITS, LEDS SHALL FLASH TO CONFIRM INTEGRITY.
R. EXERCISER (7 DAYS FROM INITIAL COMMAND).
S. TRANSFER LOAD WHEN EXERCISING (ON/OFF SWITCH).
T. THREE PILOT LIGHTS ON FACE OF ENCLOSURE INDICATING SOURCE TO WHICH THE ATS IS CONNECTED.
U. AUXILIARY FORM-C CONTACTS FOR NORMAL AND EMERGENCY.
V. NEUTRAL AND GROUND LUGS.
W. TIMED CENTER OFF POSITION FOR MOTOR LOAD DECAY. TRANSFER TIME SHALL BE ADJUSTABLE FROM 0.1 SECOND TO 2 MINUTES MINIMUM. A MECHANICAL AND ELECTRICAL INTERLOCK SHALL BE PROVIDED TO ENSURE THAT BOTH SETS OF CONTACTS CANNOT BE CLOSED AT THE SAME TIME.
X. INTERNAL CABLING, TERMINAL BOARDS, FUSES, FUSE BLOCKS, NAMEPLATES, AND MISCELLANEOUS HARDWARE AS NEEDED.

UPON POWER OUTAGE, THE TRANSFER SWITCH SHALL SIGNAL THE ENGINE GENERATOR TO START. WHEN GENERATOR OUTPUT REACHES APPROXIMATELY 90% RATED VOLTAGE AND SPEED, LOAD SHALL BE TRANSFERRED FROM THE NORMAL TO THE EMERGENCY SOURCE. MAXIMUM TIME FOR GENERATOR ON-LINE SHALL BE 10 SECONDS. TRANSFER SWITCH SHALL RE-TRANSFER LOAD TO THE UTILITY BUS AND ENGINE SHALL GO INTO A COOLDOWN PERIOD. THIS PERIOD SHALL BE AUTOMATICALLY OVERRIDDEN IN THE EVENT OF AN ADDITIONAL UTILITY FAILURE. THE COOLDOWN SHALL LAST FOR TEN MINUTES. THE SWITCH SHALL BE SHIPPED SEPARATELY FROM THE GENERATOR FOR INSTALLATION IN A DIFFERENT LOCATION FROM THE GENSET.

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ENCLOSURE

PROVIDE A WEATHERPROOF, SOUND ATTENUATING TYPE ENCLOSURE WITH THE FOLLOWING CHARACTERISTICS:

A. RIGIDITY WIND TEST EQUAL TO 115 MPH
B. ROOF LOAD EQUAL TO 50 LBS. PER SQ. FT.
C. RAIN TEST EQUAL TO 4" PER HOUR
D. ENCLOSURE CERTIFIED TO MEET THE FOLLOWING BUILDING CODES:

1. IBC BUILDING CODE
2. IBC BASIC MECHANICAL CODE SOUND ENCLOSURE FEATURES:

A. INCLUDES ALL OF THE WEATHER ENCLOSURE FEATURES WITH THE ADDITION OF ACOUSTIC INSULATION AMTERIAL.
B. ACOUSTIC INSULATION THAT MEETS UL 94 HF1 FLAMMABILITY CLASSIFICATION AND REPELS MOISTURE ABSORBTION
C. SOUND ATTENUATED ENCLOSURE SHALL OFFER AN AVERAGE OF 67.5 db(A) SOUND LEVEL AT 7 M (23FT) USING UP TO 25 mm (1 IN) OF ACOUSTIC INSULATION, ACOUSTIC-LINED AIR INLET HOODS, AND ACOUSTIC-LINED AIR DISCHARGE HOOD.

LIFT RINGS

A. FOUR (4) STEEL LIFT RINGS. WELDED AND BOLTED TO UNDERFRAME FOR COMBINED ENCLOSURE/EQUIPMENT WEIGHT.

REMOVAL PANELS

A. REMOVABLE SERVICE PANELS LOCATED AS REQUIRED BY GENERATOR MANUFACTURER, WILL BE PROVIDED FOR EQUIPMENT INSTALLATION, AND SERVICE.

LOUVERS AND/OR HOODS

A. LOUVERS AND/OR HOODS WILL BE ALL-ALUMINUM CONSTRUCTION RIVETED INTO ALUMINIZED METAL FRAME FORMING A RIGID, WATER-RESISTANT ASSEMBLY, FIXED, GRAVITY OR MOTORIZED LOUVERS WILL BE FURNISHED, AS SPECIFIED. LOUVERS AND HOODS WILL BE PROPERLY SIZED TO ALLOW SUFFICIENT ENGINE COMBUSTION AND RADIATOR AIR FLOW.

DAMPERS

A. ELECTRICAL PACKAGE: ENCLOSURE SHALL HOUSE SPECIFIC PRE-WIRED, (PER NEC USING CONDUIT & 600V BUILDING WIRE) ELECTRICAL EQUIPMENT AND DEVICES AS SPECIFIED ON DRAWINGS. INCLUDING CONVENIENCE OUTLETS AS REQUIRED.
B. INSECT SCREEN ON VENTILATION OPENINGS

TESTING

FACTORY TESTS

A. GENERATOR SET FACTORY TESTS ON THE EQUIPMENT TO BE SHIPPED, SHALL BE PERFORMED AT RATED LOAD AND RATED PF. GENERATOR SETS THAT HAVE NOT BEEN FACTORY TESTED AT RATED PF WILL NOT BE ACCEPTABLE. TESTS SHALL INCLUDE: RUN AT FULL LOAD, MAXIMUM POWER, VOLTAGE REGULATION, TRANSIENT AND STEADY- STATE GOVERNING, SINGLE STEP LOAD PICKUP, AND SAFETY SHUTDOWNS.
B. TRANSFER EQUIPMENT FACTORY TESTS: AUTOMATIC BYPASS TRANSFER SWITCH SHALL BE FACTORY TESTED BEFORE SHIPMENT. FACTORY TESTS SHALL INCLUDE A COMPLETE FUNCTIONAL TEST OF THE TRANSFER SWITCH CONTROLS, INCLUDING CALIBRATION OF THE VOLTAGE SENSORS. FURNISH ALL FACTORY TEST RESULTS OF GENSET AND TRANSFER SWITCH TO THE OWNER FOR HIS RECORDS (MINIMUM SIX SETS).
C. THE OWNER'S REPRESENTATIVE WILL BE NOTIFIED 2 WEEKS PRIOR TO BEGINNING OF WITNESS TESTING.

ON SITE ACCEPTANCE TEST

A. THE COMPLETE INSTALLATION SHALL BE TESTED FOR COMPLIANCE WITH THE SPECIFICATION FOLLOWING COMPLETION OF ALL SITE WORK. TESTING SHALL BE CONDUCTED BY QUALIFIED TRAINED REPRESENTATIVE OF THE MANUFACTURER, WITH REQUIRED FUEL SUPPLIED BY INSTALLATION CONTRACTOR. THE ENGINEER SHALL BE NOTIFIED IN ADVANCE AND TEST TO BE CONDUCTED ON- SITE SHALL INCLUDE A "COLD START" TEST. A TWO HOUR FULL LOAD TEST, AND A ONE STEP RATED LOAD PICKUP TEST IN ACCORDANCE WITH NFPA 110. PROVIDE A RESISTIVE LOAD BANK AND MAKE TEMPORARY CONNECTIONS FOR FULL LOAD TEST. LOAD BANK SHALL BE ADJUSTABLE TO ACCOMMODATE ACTUAL BUILDING LOAD, IF REQUIRED. LOAD BANK PROVIDED BY MANUFACTURER AND WIRED BY INSTALLATION CONTRACTOR.
B. COMPLETELY TEST AND CHECK- OUT: ALL FLUID LEVELS AND FILTERS. GENERATOR CONTROLS. ENGINE HEATER, BATTERY CHARGER AND AUTOMATIC TRANSFER SWITCH FUNCTIONS IN BOTH NORMAL AND EMERGENCY POSITIONS. CHECK FOR: EXHAUST AND FUEL LEAKS, EXCESSIVE VIBRATION AND PHASE ROTATION. MAKE THE FOLLOWING ADJUSTMENTS AND SETTINGS: GENERATOR SPEED AND ALL AUTOMATIC TRANSFER SWITCH RELAYS AND TIMERS TO THE SATISFACTION OF THE OWNER FOR PROPER STANDBY POWER SYSTEM OPERATIONS. TEST RESULTS SHALL INCLUDE ENGINE TEMPERATURE. OIL PRESSURE, BATTERY CHARGE LEVEL AND FREQUENT INTERVALS THROUGHOUT THE TESTS. FURNISH ALL TEST RESULTS TO THE OWNER FOR RECORDS.
C. MANUFACTURER'S FIELD REPRESENTATIVE SHALL ARRANGE FOR ONE (1) DAY OF ON- SITE TRAINING FOR OWNER PERSONNEL IN THE OPERATION OF THE SYSTEM. THE TIME AND DATE FOR THIS TRAINING PERIOD SHALL BE COORDINATED WITH THE OWNER.

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1	6-25-15	ADDENDA NO. 1	AMP	AMP

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SPECIFICATIONS (CONTINUED)

HOUSING AUTHORITY CITY OF PERTH AMBOY

STANDYBY GENERATOR INSTALLATION

881 AMBOY AVENUE
PERTH AMBOY, NJ 08862

PERTH AMBOY
MONMOUTH COUNTY NEW JERSEY

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AUTOMATIC TRANSFER SWITCH SPECIFICATIONS

PART 1 GENERAL

1.01 SCOPE

A. FURNISH AND INSTALL AUTOMATIC TRANSFER SWITCH (ATS) WITH NUMBER OF POLES, AMPERAGE, VOLTAGE, WITHSTAND AND CLOSE-ON RATINGS AS SHOWN ON THE PLANS. AUTOMATIC TRANSFER SHALL CONSIST OF AN INHERENTLY DOUBLE THROW POWER TRANSFER SWITCH MECHANISM AND A MICROPROCESSOR CONTROLLER TO PROVIDE AUTOMATIC OPERATION. ALL TRANSFER SWITCHES AND CONTROLLERS SHALL BE THE PRODUCTS OF THE SAME MANUFACTURER.

B. PROVIDE RELAYS AS REQUIRED FOR TIME DELAY "ON" OF MECHANICAL EQUIPMENT AND LOAD SHED.

1.02 CODES AND STANDARDS

THE AUTOMATIC TRANSFER SWITCHES AND CONTROLS SHALL CONFORM TO THE REQUIREMENTS OF:

A. UL 1008 - STANDARD FOR TRANSFER SWITCH EQUIPMENT
B. IEC 947-6-1 LOW-VOLTAGE SWITCHGEAR AND CONTROL GEAR; MULTIFUNCTION EQUIPMENT; AUTOMATIC TRANSFER SWITCHING EQUIPMENT
C. NFPA 70 - NATIONAL ELECTRICAL CODE
D. NFPA 110 - EMERGENCY AND STANDBY POWER SYSTEMS
E. IEEE STANDARD 446 - IEEE RECOMMENDED PRACTICE FOR EMERGENCY AND STANDBY POWER SYSTEMS FOR COMMERCIAL AND INDUSTRIAL APPLICATIONS
F. NEMA STANDARD ICS10-1993 (FORMERLY ICS2-447) - AC AUTOMATIC TRANSFER SWITCHES
G. UL 508 INDUSTRIAL CONTROL EQUIPMENT

1.03 ACCEPTABLE MANUFACTURERS

AUTOMATIC TRANSFER SWITCHES SHALL BE ASCO 3000 SERIES OR APPROVED EQUAL.

PART 2 PRODUCTS

2.01 MICROPROCESSOR CONTROLLER

A. THE CONTROLLER'S SENSING AND LOGIC SHALL BE PROVIDED BY A SINGLE BUILT-IN MICROPROCESSOR FOR MAXIMUM RELIABILITY, MINIMUM MAINTENANCE, AND THE ABILITY TO COMMUNICATE SERIALLY THROUGH AN OPTIONAL SERIAL COMMUNICATION MODULE.

B. A SINGLE CONTROLLER SHALL PROVIDE TWELVE SELECTABLE NOMINAL VOLTAGES FOR MAXIMUM APPLICATION FLEXIBILITY AND MINIMAL SPARE PART REQUIREMENTS. VOLTAGE SENSING SHALL BE TRUE RMS TYPE AND SHALL BE ACCURATE TO 1% OF NOMINAL VOLTAGE. FREQUENCY SENSING SHALL BE ACCURATE TO 0.2%. THE PANEL SHALL BE CAPABLE OF OPERATING OVER A TEMPERATURE RANGE OF -20 TO +60 DEGREES C AND STORAGE FROM -55 TO +85 DEGREES C.

C. THE CONTROLLER SHALL BE CONNECTED TO THE TRANSFER SWITCH BY AN INTERCONNECTING WIRING HARNESS. THE HARNESS SHALL INCLUDE A KEYED DISCONNECT PLUG TO ENABLE THE CONTROLLER TO BE DISCONNECTED FROM THE TRANSFER SWITCH FOR ROUTINE MAINTENANCE. SENSING AND CONTROL LOGIC SHALL BE PROVIDED ON MULTI-LAYER PRINTED CIRCUIT BOARDS. INTERFACING RELAYS SHALL BE INDUSTRIAL GRADE PLUG-IN TYPE WITH DUST COVERS. THE PANEL SHALL BE ENCLOSED WITH A PROTECTIVE COVER AND BE MOUNTED SEPARATELY FROM THE TRANSFER SWITCH UNIT FOR SAFETY AND EASE OF MAINTENANCE. THE PROTECTIVE COVER SHALL INCLUDE A BUILT-IN POCKET FOR STORAGE OF THE OPERATOR'S MANUALS.

D. ALL CUSTOMER CONNECTIONS SHALL BE WIRED TO A COMMON TERMINAL BLOCK TO SIMPLIFY FIELD-WIRING CONNECTIONS.

E. THE CONTROLLER SHALL MEET OR EXCEED THE REQUIREMENTS FOR ELECTROMAGNETIC COMPATIBILITY (EMC) AS FOLLOWS:

1.	EN 55011:1991	EMISSION STANDARD - GROUP 1, CLASS A
2.	EN 50082-2:1995	GENERIC IMMUNITY STANDARD, FROM WHICH:
	EN 61000-4-2:1995	ELECTROSTATIC DISCHARGE (ESD) IMMUNITY
	ENV 50140:1993	RADIATED ELECTRO-MAGNETIC FIELD IMMUNITY
	EN 61000-4-4:1995	ELECTRICAL FAST TRANSIENT (EFT) IMMUNITY
	EN 61000-4-5:1995	SURGE TRANSIENT IMMUNITY
	EN 61000-4-6:1996	CONDUCTED RADIO-FREQUENCY FIELD IMMUNITY
3.	IEEE472 (ANSI C37.90A) RING WAVE TEST.	

2.03 ENCLOSURE

A. THE ATS SHALL BE FURNISHED IN A TYPE 3R ENCLOSURE UNLESS OTHERWISE SHOWN ON THE PLANS.

B. ALL STANDARD AND OPTIONAL DOOR-MOUNTED SWITCHES AND PILOT LIGHTS SHALL BE 16-MM INDUSTRIAL GRADE TYPE OR EQUIVALENT FOR EASY VIEWING & REPLACEMENT. DOOR CONTROLS SHALL BE PROVIDED ON A SEPARATE REMOVABLE PLATE, WHICH CAN BE SUPPLIED LOOSE FOR OPEN TYPE UNITS.

C. A PRESSURE DISCONNECT LINK SHALL BE PROVIDED TO DISCONNECT THE NORMAL SOURCE NEUTRAL CONNECTION FROM THE EMERGENCY AND LOAD NEUTRAL CONNECTIONS FOR 4-MM WIRE APPLICATIONS. A GROUND BUS SHALL BE PROVIDED FOR CONNECTION OF THE GROUNDING CONDUCTOR TO THE GROUNDING ELECTRODE. A PRESSURE DISCONNECT LINK FOR THE NEUTRAL TO GROUND BONDING JUMPER SHALL BE PROVIDED TO CONNECT THE NORMAL NEUTRAL CONNECTION TO THE GROUND BUS.

PART 3 OPERATIONS

3.01 CONTROLLER DISPLAY AND KEYPAD

A. A FOUR LINE, 20 CHARACTER LCD DISPLAY AND KEYPAD SHALL BE AN INTEGRAL PART OF THE CONTROLLER FOR VIEWING ALL AVAILABLE DATA AND SETTING DESIRED OPERATIONAL PARAMETERS. OPERATIONAL PARAMETERS SHALL ALSO BE AVAILABLE FOR VIEWING AND LIMITED CONTROL THROUGH THE SERIAL COMMUNICATIONS INPUT PORT. THE FOLLOWING PARAMETERS SHALL ONLY BE ADJUSTABLE VIA DIP SWITCHES ON THE CONTROLLER:

1. NOMINAL LINE VOLTAGE AND FREQUENCY
2. SINGLE OR THREE PHASE SENSING
3. OPERATING PARAMETER PROTECTION
4. TRANSFER OPERATING MODE CONFIGURATION (OPEN TRANSITION)

ALL INSTRUCTIONS AND CONTROLLER SETTINGS SHALL BE EASILY ACCESSIBLE, READABLE AND ACCOMPLISHED WITHOUT THE USE OF CODES, CALCULATIONS, OR INSTRUCTION MANUALS.

3.02 VOLTAGE, FREQUENCY AND PHASE ROTATION SENSING

A. VOLTAGE AND FREQUENCY ON BOTH THE NORMAL AND EMERGENCY SOURCES (AS NOTED BELOW) SHALL BE CONTINUOUSLY MONITORED, WITH THE FOLLOWING PICKUP, DROPOUT, AND TRIP SETTING CAPABILITIES (VALUES SHOWN AS % OF NOMINAL UNLESS OTHERWISE SPECIFIED):

PARAMETER	SOURCES	DROPOUT / TRIP	PICKUP/RESET
UNDERVOLTAGE	N&E,3Ø	70 - 98%	85 - 100%
OVERVOLTAGE	N&E,3Ø	102 - 115%	2% BELOW TRIP
UNDERFREQUENCY	N&E	85 - 98%	90 - 100%
OVER FREQUENCY	N&E	102 - 10%	2% BELOW TRIP
VOLTAGE UNBALANCE	N&E	5 TO 20%	1% BELOW DROPOUT

B. REPETITIVE ACCURACY OF ALL SETTINGS SHALL BE WITHIN ± 0.5% OVER AN OPERATING TEMPERATURE RANGE OF -20C TO 60C.

C. VOLTAGE AND FREQUENCY SETTINGS SHALL BE FIELD ADJUSTABLE IN 1% INCREMENTS EITHER LOCALLY WITH THE DISPLAY AND KEYPAD OR REMOTELY VIA SERIAL COMMUNICATIONS PORT ACCESS.

D. THE CONTROLLER SHALL BE CAPABLE (WHEN ACTIVATED BY THE KEYPAD OR THROUGH THE SERIAL PORT) OF SENSING THE PHASE ROTATION OF BOTH THE NORMAL AND EMERGENCY SOURCES. THE SOURCE SHALL BE CONSIDERED UNACCEPTABLE IF THE PHASE ROTATION IS NOT THE PREFERRED ROTATION SELECTED (ABC OR CBA).

E. SOURCE STATUS SCREENS SHALL BE PROVIDED FOR BOTH NORMAL & EMERGENCY TO PROVIDE DIGITAL READOUT OF VOLTAGE ON ALL 3 PHASES, FREQUENCY, AND PHASE ROTATION.

F. THE CONTROLLER SHALL INCLUDE A USER SELECTABLE ALGORITHM TO PREVENT REPEATED TRANSFER CYCLING TO A SOURCE ON AN INSTALLATION WHICH EXPERIENCES PRIMARY SIDE, SINGLE PHASE FAILURES ON A GROUNDED WYE - GROUNDED WYE TRANSFORMER WHICH REGENERATES VOLTAGE WHEN UNLOADED. THE ALGORITHM SHALL ALSO INHIBIT RETRANSFER TO THE NORMAL (UTILITY) SOURCE UPON DETECTION OF A SINGLE PHASING CONDITION UNTIL A DEDICATED TIMER EXPIRES, THE ALTERNATE SOURCE FAILS, OR THE NORMAL SOURCE FAILS COMPLETELY AND IS RESTORED DURING THIS TIME DELAY PERIOD. THE TIME DELAYS ASSOCIATED WITH THIS FEATURE SHALL BE ADJUSTABLE BY THE USER THROUGH THE CONTROLLER KEYPAD AND LCD.

3.03 TIME DELAYS

A. AN ADJUSTABLE TIME DELAY OF 0 TO 6 SECONDS SHALL BE PROVIDED TO OVERRIDE MOMENTARY NORMAL SOURCE OUTAGES AND DELAY ALL TRANSFER AND ENGINE STARTING SIGNALS. CAPABILITY SHALL BE PROVIDED TO EXTEND THIS TIME DELAY TO 60 MINUTES BY PROVIDING AN EXTERNAL 24 VDC POWER SUPPLY.

B. A TIME DELAY SHALL BE PROVIDED ON TRANSFER TO EMERGENCY, ADJUSTABLE FROM 0 TO 60 MINUTES, FOR CONTROLLED TIMING OF TRANSFER OF LOADS TO EMERGENCY.

C. TWO TIME DELAY MODES (WHICH ARE INDEPENDENTLY ADJUSTABLE) SHALL BE PROVIDED ON RE-TRANSFER TO NORMAL. ONE TIME DELAY SHALL BE FOR ACTUAL NORMAL POWER FAILURES AND THE OTHER FOR THE TEST MODE FUNCTION. THE TIME DELAYS SHALL BE ADJUSTABLE FROM 0 TO 60 MINUTES. TIME DELAY SHALL BE AUTOMATICALLY BYPASSED IF THE EMERGENCY SOURCE FAILS AND THE NORMAL SOURCE IS ACCEPTABLE.

D. A TIME DELAY SHALL BE PROVIDED ON SHUT DOWN OF ENGINE GENERATOR FOR COOL DOWN, ADJUSTABLE FROM 0 TO 60 MINUTES.

E. A TIME DELAY ACTIVATED OUTPUT SIGNAL SHALL ALSO BE PROVIDED TO DRIVE AN EXTERNAL RELAY(S) FOR SELECTIVE LOAD DISCONNECT CONTROL. THE CONTROLLER SHALL HAVE THE ABILITY TO ACTIVATE AN ADJUSTABLE 0 TO 5 MINUTE TIME DELAY IN ANY OF THE FOLLOWING MODES:

1. PRIOR TO TRANSFER ONLY.
2. PRIOR TO AND AFTER TRANSFER.
3. NORMAL TO EMERGENCY ONLY.
4. EMERGENCY TO NORMAL ONLY.
5. NORMAL TO EMERGENCY AND EMERGENCY TO NORMAL.
6. ALL TRANSFER CONDITIONS OR ONLY WHEN BOTH SOURCES ARE AVAILABLE.

F. NOT USED

G. NOT USED.

3.04 ADDITIONAL FEATURES

A. A THREE POSITION MOMENTARY-TYPE TEST SWITCH SHALL BE PROVIDED FOR THE TEST / AUTOMATIC / RESET MODES. THE TEST POSITION WILL SIMULATE A NORMAL SOURCE FAILURE. THE RESET POSITION SHALL BYPASS THE TIME DELAYS ON EITHER TRANSFER TO EMERGENCY OR RETRANSFER TO NORMAL.

B. A SPDT CONTACT, RATED 5 AMPS AT 30 VDC, SHALL BE PROVIDED FOR A LOW-VOLTAGE ENGINE START SIGNAL. THE START SIGNAL SHALL PREVENT DRY CRANKING OF THE ENGINE BY REQUIRING THE GENERATOR SET TO REACH PROPER OUTPUT, AND RUN FOR THE DURATION OF THE COOL DOWN SETTING, REGARDLESS OF WHETHER THE NORMAL SOURCE RESTORES BEFORE THE LOAD IS TRANSFERRED.

C. AUXILIARY CONTACTS, RATED 10 AMPS, 250 VAC SHALL BE PROVIDED CONSISTING OF ONE CONTACT, CLOSED WHEN THE ATS IS CONNECTED TO THE NORMAL SOURCE AND ONE CONTACT CLOSED, WHEN THE ATS IS CONNECTED TO THE EMERGENCY SOURCE.

D. LED INDICATING LIGHTS (16 MM INDUSTRIAL GRADE, TYPE 12) SHALL BE PROVIDED; ONE TO INDICATE WHEN THE ATS IS CONNECTED TO THE NORMAL SOURCE (GREEN) AND ONE TO INDICATE WHEN THE ATS IS CONNECTED TO THE EMERGENCY SOURCE (RED).

E. LED INDICATING LIGHTS (16 MM INDUSTRIAL GRADE, TYPE 12) SHALL BE PROVIDED AND ENERGIZED BY CONTROLLER OUTPUTS. THE LIGHTS SHALL PROVIDE TRUE SOURCE AVAILABILITY OF THE NORMAL AND EMERGENCY SOURCES, AS DETERMINED BY THE VOLTAGE SENSING TRIP AND RESET SETTINGS FOR EACH SOURCE.

F. THE FOLLOWING FEATURES SHALL BE BUILT-IN TO THE CONTROLLER, BUT CAPABLE OF BEING ACTIVATED THROUGH KEYPAD PROGRAMMING OR THE SERIAL PORT ONLY WHEN REQUIRED BY THE USER:

F.A. PROVIDE THE ABILITY TO SELECT "COMMIT/NO COMMIT TO TRANSFER" TO DETERMINE WHETHER THE LOAD SHOULD BE TRANSFERRED TO THE EMERGENCY GENERATOR IF THE NORMAL SOURCE RESTORES BEFORE THE GENERATOR IS READY TO ACCEPT THE LOAD.

F.B. TERMINALS SHALL BE PROVIDED FOR A REMOTE CONTACT WHICH OPENS TO SIGNAL THE ATS TO TRANSFER TO EMERGENCY AND FOR REMOTE CONTACTS WHICH OPEN TO INHIBIT TRANSFER TO EMERGENCY AND/OR RETRANSFER TO NORMAL. BOTH OF THESE INHIBIT SIGNALS CAN BE ACTIVATED THROUGH THE KEYPAD OR SERIAL PORT.

F.C. AN INPHASE MONITOR SHALL BE PROVIDED IN THE CONTROLLER. THE MONITOR SHALL CONTROL TRANSFER SO THAT MOTOR LOAD INRUSH CURRENTS DO NOT EXCEED NORMAL STARTING CURRENTS, AND SHALL NOT REQUIRE EXTERNAL CONTROL OF POWER SOURCES. THE INPHASE MONITOR SHALL BE SPECIFICALLY DESIGNED FOR AND BE THE PRODUCT OF THE ATS MANUFACTURER. THE INPHASE MONITOR SHALL BE EQUAL TO ASCO FEATURE 27.

F.D. THE CONTROLLER SHALL BE CAPABLE OF ACCEPTING A NORMALLY OPEN CONTACT THAT WILL ALLOW THE TRANSFER SWITCH TO FUNCTION IN A NON-AUTOMATIC MODE USING AN EXTERNAL CONTROL DEVICE.

F.E. ENGINE EXERCISER - THE CONTROLLER SHALL PROVIDE AN INTERNAL ENGINE EXERCISER. THE ENGINE EXERCISER SHALL ALLOW THE USER TO PROGRAM UP TO SEVEN DIFFERENT EXERCISE ROUTINES. FOR EACH ROUTINE, THE USER SHALL BE ABLE TO:

F.E.A. ENABLE OR DISABLE THE ROUTINE.

F.E.B. ENABLE OR DISABLE TRANSFER OF THE LOAD DURING ROUTINE.

F.E.C. SET THE START TIME:

- TIME OF DAY
- DAY OF WEEK
- WEEK OF MONTH (1ST, 2ND, 3RD, 4TH, ALTERNATE OR EVERY)

F..A. SET THE DURATION OF THE RUN.

F.A. AT THE END OF THE SPECIFIED DURATION THE SWITCH SHALL TRANSFER THE LOAD BACK TO NORMAL AND RUN THE GENERATOR FOR THE SPECIFIED COOL DOWN PERIOD. A 10-YEAR LIFE BATTERY THAT SUPPLIES POWER TO THE REAL TIME CLOCK IN THE EVENT OF A POWER LOSS WILL MAINTAIN ALL TIME AND DATE INFORMATION.

F.B. SYSTEM STATUS - THE CONTROLLER LCD DISPLAY SHALL INCLUDE A "SYSTEM STATUS" SCREEN WHICH SHALL BE READILY ACCESSIBLE FROM ANY POINT IN THE MENU BY DEPRESSING THE "ESC" KEY A MAXIMUM OF TWO TIMES. THIS SCREEN SHALL DISPLAY A CLEAR DESCRIPTION OF THE ACTIVE OPERATING SEQUENCE AND SWITCH POSITION. FOR EXAMPLE,

NORMAL FAILED
LOAD ON NORMAL
TD NORMAL TO EMERG
2MIN15S

F.C. CONTROLLERS THAT REQUIRE MULTIPLE SCREENS TO DETERMINE SYSTEM STATUS OR DISPLAY "CODED" SYSTEM STATUS MESSAGES, WHICH MUST BE EXPLAINED BY REFERENCES IN THE OPERATOR'S MANUAL, ARE NOT PERMISSIBLE.

F.D. SELF DIAGNOSTICS - THE CONTROLLER SHALL CONTAIN A DIAGNOSTIC SCREEN FOR THE PURPOSE OF DETECTING SYSTEM ERRORS. THIS SCREEN SHALL PROVIDE INFORMATION ON THE STATUS INPUT SIGNALS TO THE CONTROLLER WHICH MAY BE PREVENTING LOAD TRANSFER COMMANDS FROM BEING COMPLETED.

F.E. COMMUNICATIONS INTERFACE - THE CONTROLLER SHALL BE CAPABLE OF INTERFACING, THROUGH AN OPTIONAL SERIAL COMMUNICATION MODULE, WITH A NETWORK OF TRANSFER SWITCHES, LOCALLY (UP TO 4000 FT.) OR REMOTELY THROUGH MODEM SERIAL COMMUNICATIONS. STANDARD SOFTWARE SPECIFIC FOR TRANSFER SWITCH APPLICATIONS SHALL BE AVAILABLE BY THE TRANSFER SWITCH MANUFACTURER. THIS SOFTWARE SHALL ALLOW FOR THE MONITORING, CONTROL AND SETUP OF PARAMETERS.

F.F. DATA LOGGING - THE CONTROLLER SHALL HAVE THE ABILITY TO LOG DATA AND TO MAINTAIN THE LAST 99 EVENTS, EVEN IN THE EVENT OF TOTAL POWER LOSS. THE FOLLOWING EVENTS SHALL BE TIME AND DATE STAMPED AND MAINTAINED IN A NON-VOLATILE MEMORY:

- EVENT LOGGING
- 1. DATA AND TIME AND REASON FOR TRANSFER NORMAL TO EMERGENCY.
- 2. DATA AND TIME AND REASON FOR TRANSFER EMERGENCY TO NORMAL.
- 3. DATA AND TIME AND REASON FOR ENGINE START.
- 4. DATA AND TIME ENGINE STOPPED.
- 5. DATA AND TIME EMERGENCY SOURCE AVAILABLE.
- 6. DATA AND TIME EMERGENCY SOURCE NOT AVAILABLE.

- STATISTICAL DATA
- 1. TOTAL NUMBER OF TRANSFERS.
- 2. TOTAL NUMBER OF TRANSFERS DUE TO SOURCE FAILURE.
- 3. TOTAL NUMBER OF DAYS CONTROLLER IS ENERGIZED.
- 4. TOTAL NUMBER OF HOURS BOTH NORMAL AND EMERGENCY SOURCES ARE AVAILABLE.

F.J. COMMUNICATIONS MODULE - A FULL DUPLEX RS485 INTERFACE SHALL BE INSTALLED IN THE ATS CONTROLLER TO ENABLE SERIAL COMMUNICATIONS. THE SERIAL COMMUNICATIONS SHALL BE CAPABLE OF A DIRECT CONNECT OR MULTI-DROP CONFIGURED NETWORK. THIS MODULE SHALL ALLOW FOR THE SEAMLESS INTEGRATION OF EXISTING OR NEW COMMUNICATION TRANSFER DEVICES. THE SERIAL COMMUNICATION INTERFACE SHALL BE EQUAL TO ASCO ACCESSORY 72A.

F.K. EXTERNAL DC POWER SUPPLY - AN OPTIONAL PROVISION SHALL BE AVAILABLE TO CONNECT AN EXTERNAL 24 VDC POWER SUPPLY TO ALLOW THE LCD AND THE DOOR MOUNTED CONTROL INDICATORS TO REMAIN FUNCTIONAL WHEN BOTH POWER SOURCES ARE DEAD. THIS OPTION SHALL BE EQUIVALENT TO ASCO ACCESSORY 1G.

PART 4 ADDITIONAL REQUIREMENTS

4.01 WITHSTAND AND CLOSING RATINGS

A. THE ATS SHALL BE RATED TO CLOSE ON AND WITHSTAND THE AVAILABLE RMS SYMMETRICAL SHORT CIRCUIT CURRENT AT THE ATS TERMINALS.

B. THE ATS SHALL BE UL LISTED IN ACCORDANCE WITH UL 1008 AND BE LABELED IN ACCORDANCE WITH THAT STANDARD'S 1½ AND 3 CYCLE, LONG-TIME RATINGS. ATS'S WHICH ARE NOT TESTED AND LABELED WITH 1½ AND 3 CYCLE (ANY BREAKER) RATINGS AND HAVE SERIES, OR SPECIFIC BREAKER RATINGS ONLY, ARE NOT ACCEPTABLE.

4.02 TESTS AND CERTIFICATION

A. THE COMPLETE ATS SHALL BE FACTORY TESTED TO ENSURE PROPER OPERATION OF THE INDIVIDUAL COMPONENTS AND CORRECT OVERALL SEQUENCE OF OPERATION AND TO ENSURE THAT THE OPERATING TRANSFER TIME, VOLTAGE, FREQUENCY AND TIME DELAY SETTINGS ARE IN COMPLIANCE WITH THE SPECIFICATION REQUIREMENTS.

B. UPON REQUEST, THE MANUFACTURER SHALL PROVIDE A NOTARIZED LETTER CERTIFYING COMPLIANCE WITH ALL OF THE REQUIREMENTS OF THIS SPECIFICATION INCLUDING COMPLIANCE WITH THE ABOVE CODES AND STANDARDS, AND WITHSTAND AND CLOSING RATINGS. THE CERTIFICATION SHALL IDENTIFY, BY SERIAL NUMBER(S), THE EQUIPMENT INVOLVED. NO EXCEPTIONS TO THE SPECIFICATIONS, OTHER THAN THOSE STIPULATED AT THE TIME OF THE SUBMITTAL, SHALL BE INCLUDED IN THE CERTIFICATION.

C. THE ATS MANUFACTURER SHALL BE CERTIFIED TO ISO 9001 INTERNATIONAL QUALITY STANDARD AND THE MANUFACTURER SHALL HAVE THIRD PARTY CERTIFICATION VERIFYING QUALITY ASSURANCE IN DESIGN/DEVELOPMENT, PRODUCTION, INSTALLATION AND SERVICING IN ACCORDANCE WITH ISO 9001.

4.03 SERVICE REPRESENTATION

A. THE ATS MANUFACTURER SHALL MAINTAIN A NATIONAL SERVICE ORGANIZATION OF COMPANY-EMPLOYED PERSONNEL LOCATED THROUGHOUT THE CONTIGUOUS UNITED STATES. THE SERVICE CENTER'S PERSONNEL MUST BE FACTORY TRAINED AND MUST BE ON CALL 24 HOURS A DAY, 365 DAYS A YEAR.

B. THE MANUFACTURER SHALL MAINTAIN RECORDS OF EACH SWITCH, BY SERIAL NUMBER, FOR A MINIMUM OF 20 YEARS.

No.	Date	Revision	Revised By	Checked By
1	6-25-15	ADDENDA NO. 1	AMP	AMP

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SPECIFICATIONS (CONTINUED)

HOUSING AUTHORITY CITY OF PERTH AMBOY

STANDYBY GENERATOR INSTALLATION

881 AMBOY AVENUE
PERTH AMBOY, NJ 08862

PERTH AMBOY
MONMOUTH COUNTY NEW JERSEY

DATE:	DESIGNED BY:	SCALE:	PROJECT NUMBER:
06/03/2015	AMP	AS NOTED	6805.001
DRAWN BY:	CHECKED BY:	FIELD BOOK:	SHEET:
AMP	AHG		E-302

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